SCIENCE, ENGINEERING, AND HUMANITIES DOCTORATES IN THE UNITED STATES

1979 PROFILE

Based on the
1979 Survey of
Science, Engineering, and Humanities Doctorates

The Survey of Doctorate Recipients is conducted by the National Research Council with the support of the National Science Foundation, the National Endowment for the Humanities, the National Institutes of Health, and the Department of Energy

Betty D. Maxfield
Project Director

Commission on Human Resources
NATIONAL RESEARCH COUNCIL

NATIONAL ACADEMY OF SCIENCES
Washington, D.C.
1980

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This report is based on the 1979 Survey of Doctorate Recipients (SDR), a project approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The survey project is part of the program of the Commission on Human Resources.

The Commission on Human Resources has reviewed this report in accordance with procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

ACKNOWLEDGMENTS

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The Survey of Doctorate Recipients (SDR) project is under the administrative supervision of Betty D. Maxfield. Andrew Spisak, Research Associate, was primarily responsible for the programming of the summary statistics included in the report and for the drafting of the technical appendices. Betty Maxfield, Project Director, was responsible for writing the report. Doris Rogowski of the CHR Supporting Services Office supervised the coding of the questionnaires, and George Boyce of the CHR Data Processing Office performed the data processing activities associated with the survey. William C. Kelly, Director of the Commission on Human Resources, provided administrative assistance and, along with members of the Commission on Human Resources, provided policy guidance to the staff.

J. James Brown of the National Science Foundation's Division of Science Resources Studies served as the responsible staff officer at the Foundation and, with Stanley Turesky of the National Endowment for the Humanities and William Copeland of the National Institutes of Health, provided assistance and helpful advice to the Survey of Doctorate Recipients' staff.

Many members of the scientific and engineering communities provided assistance in obtaining current mailing addresses for the survey sample. They include representatives of the professional societies, graduate deans, academic department chairmen and other university officials.

Finally, the doctorate holding scientists, engineers, and humanists who responded to this survey deserve thanks for their cooperation. It was their responsiveness that made this report possible.

Betty D. Maxfield
Director
Survey of Doctorate Recipients

FOR FURTHER INFORMATION

Further analyses of the 1979 survey data will be done in 1980, and additional reports will be forthcoming. Meanwhile, questions may be directed to:

Survey of Doctorate Recipients
Commission on Human Resources
National Research Council
2101 Constitution Ave.
Washington, D.C. 20418

Other reports of the Commission on Human Resources derived from the 1973, 1975, and/or 1977 survey data are listed below:

"Doctoral Scientists and Engineers in the United States: 1973 Profile." (March, 1974)

"Field Mobility of Doctoral Scientists and Engineers." (1975)

"An Evaluation of the 1973 Survey of Doctoral Scientists and Engineers." (1976)

"Employment Status of Ph.D. Scientists and Engineers: 1973 and 1975." (1976)

"Doctoral Scientists and Engineers in the United States: 1975 Profile." (1976)

"Science, Engineering, and Humanities Doctorates in the United States: 1977 Profile." (1978)

"Ph.D.'s in Business and Industry." (1979)

"Career Patterns of Doctoral Scientists and Engineers: 1973-1977." (1979)

"Employment of Humanities Ph.D.'s: A Departure from Traditional Jobs." (1980)

The following reports, published by the National Science Foundation, are also based on the 1973, 1975, and/or 1977 surveys:

*"Characteristics of Doctoral Scientists and Engineers in the United States: 1973."

*"Characteristics of Doctoral Scientists and Engineers in the United States: 1975."

*"Work Activities of Employed Scientists and Engineers in the U.S. Labor Force, July 1973," *Reviews of Data on Science Resources.* (June, 1975)

*"Doctoral Scientists and Engineers in Private Industry, 1973," *Reviews on Data on Science Resources.* (April, 1976)

**"Work Activities of Doctoral Scientists and Engineers Show Substantial Change Between 1973 and 1977," *Science Resources Studies Highlights.* (October, 1978) NSF 78-316

**"Characteristics of Doctoral Scientists and Engineers in the United States: 1977." (Detailed statistical tables) NSF 79-306

*Available from the U.S. Government Printing Office
**Available from NSF.

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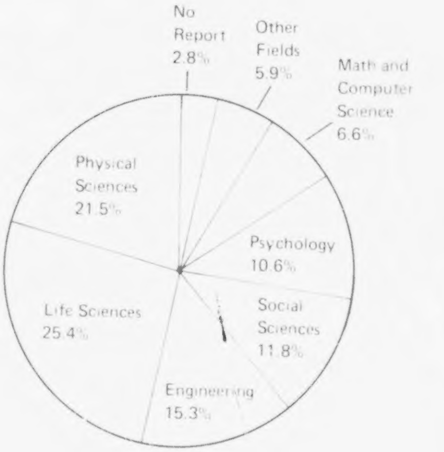
SUMMARY

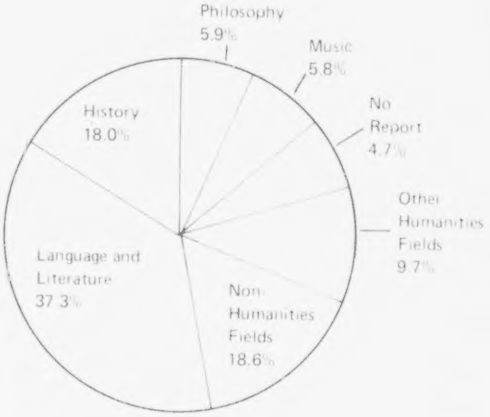
This summary is based on the results of the 1979 Survey of Doctorate Recipients conducted by the National Research Council. The analyses pertain to 395,500 scientists, engineers, and humanists who earned doctorates within the 42-year period 1936-78 and who were residing in the United States in February 1979.

Based on the survey of a sample of 49,700 Ph.D.s, the total population of Ph.D. scientists and engineers in the United States in 1979 who had received their degrees from January 1936 through June 1978 was estimated to be 324,300, of whom 308,800 were in the labor force. The equivalent figures for the humanities were 71,200 in the population and 64,800 in the labor force.

- Approximately 305,900 Ph.D. scientists and engineers were employed in February 1979: 285,400 (93.3 percent) full-time: 10,300 (3.4 percent) part-time; and 10,200 (3.3 percent) on postdoctoral appointment.
- Approximately 63,400 Ph.D.s in the humanities were employed in February 1979; 58,100 (91.6 percent) full-time; 4,800 (7.6 percent) part-time; and 500 (0.7 percent) on postdoctoral appointments.



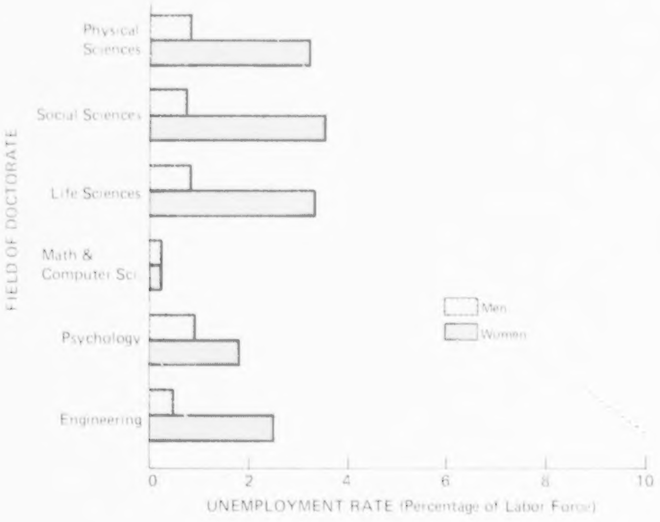
Employment Fields for Science and Engineering Ph.D.s 1979



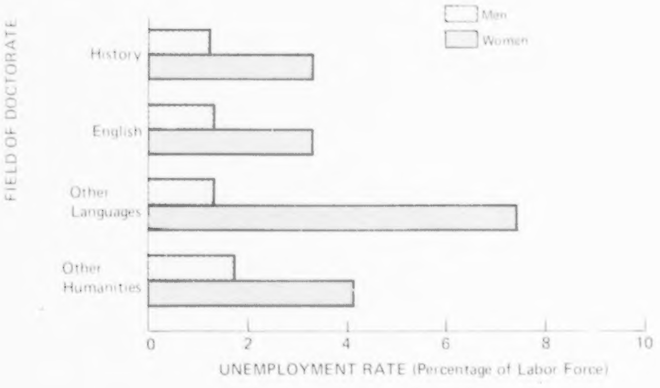
Employment Fields for Humanities Ph.D.s, 1979

- An estimated 2,900 Ph.D.s in science and engineering were employed and seeking employment in February 1979, yielding an unemployment rate of 0.9 percent of the labor force. The unemployment rate for female scientists and engineers was higher than the rate for male scientists and engineers for all fields combined (2.8 percent for women compared with 0.7 percent for men).

- An estimated 1,400 Ph.D.s in the humanities were unemployed and seeking employment in February 1979, yielding an unemployment rate of 2.2 percent of the labor force. The unemployment rate for female humanists was higher than the rate for male humanists for all fields combined (4.6 percent for women compared with 1.4 percent for men).

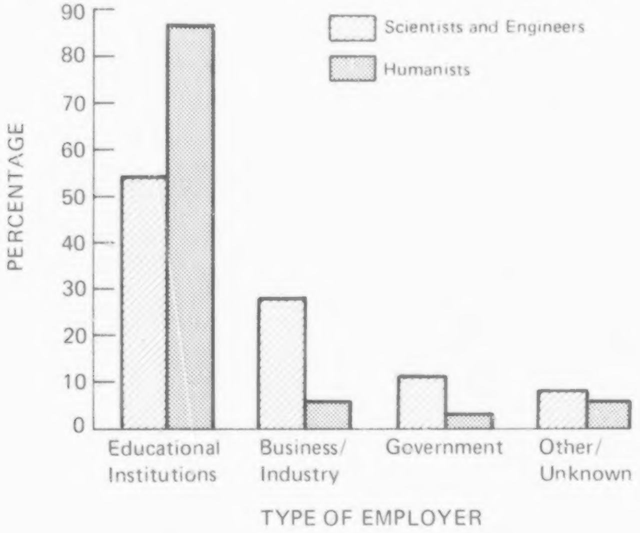


Unemployment Rates for Ph.D.s in Science and Engineering, 1979



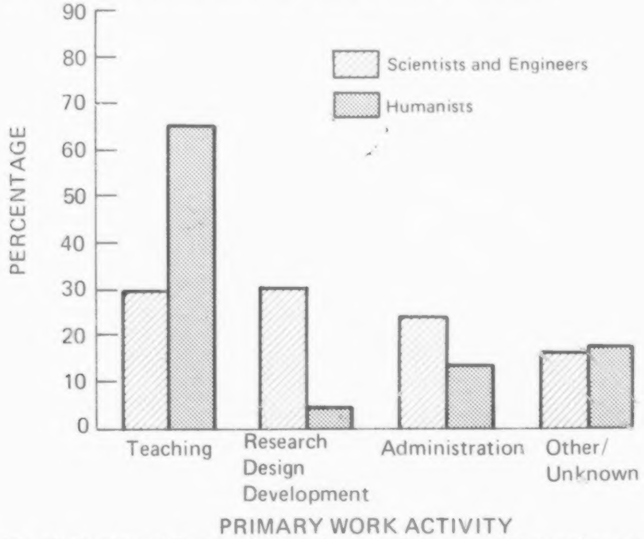
Unemployment Rates for Ph.D.s in the Humanities, 1979

- Excluding postdoctoral appointees, educational institutions employed 54 percent of the working doctoral scientists and engineers and 87 percent of the employed Ph.D.s in the humanities.



Distribution of Employed Doctoral Scientists, Engineers, and Humanists by Type of Employer (excluding postdoctoral appointees), 1979

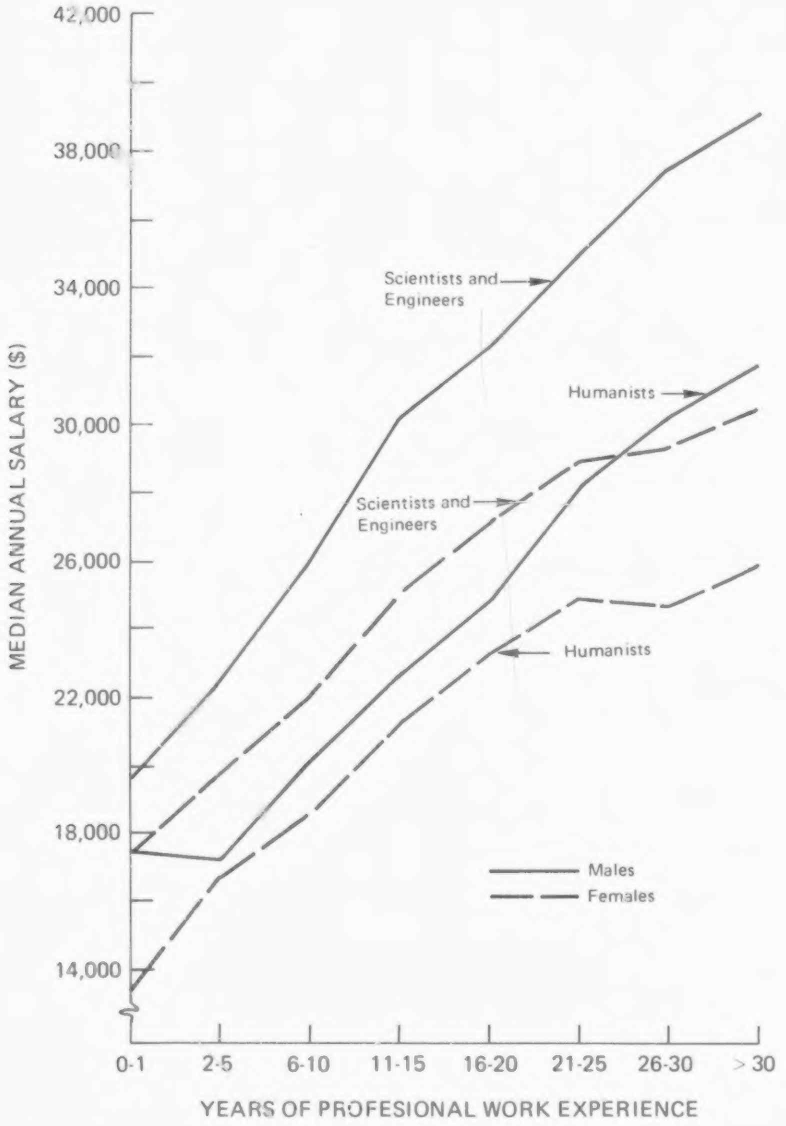
- Approximately two-thirds of the employed Ph.D.s in the humanities were engaged primarily in teaching, compared with slightly less than one-third of the science and engineering Ph.D.s.



Distribution of Employed Doctoral Scientists, Engineers, and Humanists by Primary Work Activity (excluding postdoctoral appointees), 1979

- The median annual salary in 1979 for science and engineering Ph.D.s was $29,200, with men receiving $30,000 and women earning $23,100 as median salaries.

- Ph.D.s in the humanities earned a median annual salary of $22,900 in 1979, with men and women earning $23,800 and $19,800, respectively.



Median Annual Salaries of Doctorate Recipients by Years of Professional Work Experience and Sex, 1979

- A large proportion of the doctoral population received their degrees in the 1970's: 50 percent of the science and engineering doctorates and 45 percent of the humanities doctorates.

- Only 11 percent, or 36,500 of the science and engineering doctoral population were women, with the field of psychology having the largest proportion (26 percent) of women. Nearly 26 percent, or 18,200 of the humanities Ph.D.s were female, with art history attracting the largest percentage (43 percent) of women.

- Members of racial/ethnic minority groups numbered 28,400 and accounted for 9 percent of the total population of doctorate recipients in science and engineering, and 3,700 or 5 percent of the humanities doctoral population.

INTRODUCTION

This is the fourth report on the characteristics of the nation's doctorate-level scientists[1] and engineers, and the second report to include Ph.D.s in the humanities. This report is based on the results of a biennial survey conducted in 1979 by the National Academy of Sciences (NAS-NRC) under the sponsorship of the National Science Foundation (NSF), the National Endowment for the Humanities (NEH), the National Institutes of Health (NIH), and the Department of Energy (DOE). The survey, which was based on a roster of Ph.D.s[2] in science, engineering, and the humanities, is one of three sources of information about the scientific and engineering population of the United States that the National Science Foundation has been developing as part of its Scientific and Technical Personnel (STP) System.

This report focuses primarily on the employment status and characteristics of 1936-1978 Ph.D.s in science, engineering, and the humanities who were residing in the United States in February 1979. Chapter I consists of analyses of doctorates in the sciences and engineering; Chapter II presents analyses of Ph.D.s in the humanities. The science/engineering Ph.D. broad fields include mathematics, computer sciences, physics/astronomy, chemistry, environmental sciences, engineering, life sciences (agricultural, medical, and biological), psychology, and social sciences. The humanities fields discussed in Chapter II include history, art history, music, speech, philosophy, "other humanities," English/American literature, classical languages, and modern languages and literature.

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[1] Throughout this study the population of doctorate-holding scientists was defined to include those with doctorates in the natural and social sciences, and mathematics. A detailed list of science fields appears as part of the survey questionnaire reproduced in Appendix A.

[2] Doctorate recipients such as DSc, DA, DAS, etc. are also included in the survey sample.

Additional analyses of science, engineering, and humanities doctorates employed in government, and employment patterns of science, engineering, and humanities Ph.D.s who are members of racial/minority groups are planned for 1980. The results of these studies will be reported in later publications.

The Sampling Frame[3]

The 1979 roster of science, engineering, and humanities doctorates compiled by the National Research Council, contains data on 438,078 individuals. The roster consists of scientists, engineers, and humanists who earned doctorates within the 42-year period 1936-1978. More specifically, the population contains three groups:

Segment 1 - Those individuals recorded in the NRC's Doctorate Records File, a virtually complete file of U.S. research doctorates in the natural or social sciences, mathematics, engineering, and the humanities, but excluding individuals who were foreign citizens and who, at the time they received the degree, indicated in the NRC's Survey of Earned Doctorates that they intended to leave the United States after receiving their degrees.

Segment 2 - Individuals, recorded in the NRC's Doctorate Records File, who earned their doctorates at institutions in education or professional fields and who were known to have been subsequently employed as scientists or engineers according to the NSF's Register of Scientific Personnel (1968-1970), Engineer Register (1967-1969), or Employment Survey (1971).

Segment 3 - Individuals who earned their doctorates at foreign institutions and were known to be working in the U.S. as scientists or engineers according to a number of sources such as _American Men and Women of Science_, the NSF's National Register of Scientific and Technical Personnel, federal laboratories, selected large industrial companies, and college and university catalogs of doctorate-granting unstitutions.

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[3] A detailed explanation of the sampling frame is provided in Appendix B.

Sample Selection

The sampling frame was highly stratified, with a total of 953 strata. The sample was stratified by field of doctorate or field of science/engineering employment, the year in which the doctoral degree was awarded, degree category (i.e., U.S. doctorates in the sciences, engineering, and the humanities; U.S. doctorates in education or professional fields working in science or engineering; and doctorates from foreign institutions who were employed as scientists or engineers), sex, race/ethnic group, and citizenship. A sampling rate was set for each stratum, varying from 2 to 100 percent, in order to provide sufficiently large samples for certain subgroups of the population. Within each stratum, a simple random sample was selected. The sample sizes for the six stratification categories are shown in Table C.1 of Appendix C. The overall sampling rate, from a roster of 438,078 Ph.D.s was 11.8 percent.

Sampling Rates and Sample Attrition

For the 1973, 1975, and 1977 surveys, the sample rate averaged an overall 21 percent. In 1979, the longitudinal sample was reduced in size because of budgetary constraints. The revised sample, using a sampling rate of 11.8 percent, was reviewed to assure that the survey sample was large enough to provide reliable estimates of the Ph.D. population.

A total of 90,544 individuals have been members of at least one of the four SDR samples. Of these, 29,617 or 32.7 percent have been included in all four samples: 71,676 have responded to at least one of the surveys and 13,202 have responded to all four surveys.

Survey Procedure

Out of a total sample of 51,711 individuals, 2,040 persons were known to be deceased or out-of-scope[4] prior to the survey and were therefore excluded from the survey. Thus, the survey sample consisted of 49,671 individuals.

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[4] Those individuals who were out-of-scope are described in Appendix D, Table D.1.

Addresses were obtained for 93 percent of the survey sample. The address sources included the Doctorate Records File (NRC), the National Register of Scientific and Technical Personnel (NSF), American Men and Women of Science, the National Faculty Directory, college and university catalogs, and responses from previous surveys, as well as many alumni offices, departments of individuals' baccalaureate and doctoral institutions, and several professional societies.

The initial mailing of the 1979 survey was conducted in May 1979. Two follow-up mailings to those who had not yet responded took place in September and October 1979. A special mailgram to 5,500 nonrespondents was mailed in December 1979. The data in this report are based on responses received through January 1980.

Response Rates

Responses were defined as the number of completed questionnaires that were returned by sample members as well as the number of forms that were returned with an indication that the sample member was deceased.

Information was collected on 32,877 of the 49,671 individuals in the survey sample, yielding a response rate of 66 percent. The response rate, when calculated on the basis of those in the sample who were contacted (45,994), is 72 percent.[5]

Weighting of Responses

Estimates in this report were made by weighting the response received.[6] The 2,040 individuals in the total sample of 51,711 who were known to be deceased or out-of-scope prior to the survey were excluded from the survey and weighted by sample weights (i.e., the ratio of a stratum's population size to its sample size).

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[5] See Appendix C for detailed response rates for the 1979, 1977, 1975 and 1973 survey.

[6] See Appendix D for a detailed explanation of the weighting procedure.

The responses received from the survey sample (49,671) were weighted by the product of the weight for nonresponse and the sample weight. The weight for nonresponse is the ratio of the number of survey sample cases in the stratum to the number of responses in the stratum. The weighting procedure is illustrated by the following:

Number of responses	x	Weights for nonresponse	=	Survey sample size (49,671)	x	Sample weights	=	Estimated population size using all responses (422,584)[7]
				+				+
				Those excluded from survey sample (2,040)	x	Sample weight	=	Estimated population size for excluded cases (15,494)
				Total sample size (51,711)				Estimated total population (438,078)

Responses Included in Analyses

The analyses in this report are based on individuals who earned doctorates in the sciences, engineering, and the humanities within the period January 1936 through June 1978 and who were residing in the United States in February 1979. Excluded from the analyses in this report are those Ph.D.s who are deceased, those with doctorates in education or professional fields who were working in science (see description of "Segment 2" on page 2), and those who were residing in foreign countries.

Sources of Error

The estimates in this report are subject to two types of error--sampling and nonsampling. The sampling error or standard error is a measure of the precision with which an estimate based on the survey sample approximates the average result of all possible samples of equal size. A discussion of sampling error is provided in Appendix E.

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[7] This figure is higher than the population estimates in Chapters I and II since it includes responses received from individuals residing in foreign countries, those known to be deceased in the 1979 survey, and those with doctorates in education or professional fields--all of whom are out-of-scope for this report.

Nonsampling errors may arise from a number of sources, e.g., misinterpretation of questions, errors in coding and processing, and nonresponse bias. For a discussion of nonresponse bias see Appendix F.

CHAPTER 1

SCIENCE AND ENGINEERING

DOCTORAL POPULATION BY FIELDS

Individuals in this report are classified by their field of Ph.D. degree. Chapter I is restricted to a discussion of those individuals with Ph.D.s in the sciences and engineering, while Chapter II focuses on Ph.D.s in the humanities.

Fields of doctorate for the science/engineering chapter are defined as mathematics, computer sciences, physics/astronomy, chemistry, environmental sciences, engineering, agricultural sciences, medical sciences, biological sciences, psychology, and social sciences.

The fields of employment are similarly defined and, unless otherwise stated, include Ph.D.s who were on postdoctoral appointments as well as Ph.D.s who were employed full-time and part-time. Ph.D.s who were retired or unemployed in February 1979 are not included in the employment estimates.

Table 1.1 gives the distribution of 1936-1978 doctoral scientists and engineers in the United States by field of doctorate and field of employment as of February 1979. Table 1.1 also gives the percentages of Ph.D.s who were employed in the science/engineering fields by their field of Ph.D.

In comparing this table with Table 1.1 from previous Profile reports, the reader should note that code 280 (biochemistry) from the broad field of chemistry has been merged with code 540 (biochemistry) from the broad field of biological sciences.[8] The estimated number of Ph.D.s involved in this transfer is 300 for field of doctorate and 2,600 for field of employment. Also previous Profile reports have used both field of employment and field of doctorate as independent variables in cross-tabulations. The 1979 report, however, uses only the field of doctorate.

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[8] See Appendix A -- 1979 Survey of Doctorate Recipients questionnaire--for the science/engineering specialties list which gives fine field codes and Appendix G for fine field of employment for Ph.D.s in science/engineering and the humanities.

TABLE 1.1 Distribution of Doctoral Scientists and Engineers in the United States, 1936-1978 Graduates by Field of Doctorate and Field of Employment, 1979

	Field of Doctorate		Field of Employment		
	N	%	N	% of Total Employed	% of Science-Employed+
All Fields (N)	324,300	100.0	305,900*	100.0	279,200
Mathematics	17,000	5.3	13,600	4.5	4.9
Computer Sciences	1,800	0.6	6,400	2.1	2.3
Physics/Astronomy	27,700	8.5	18,300	6.0	6.5
Chemistry	46,600	14.4	33,400	10.9	11.9
Environmental Sciences	10,400	3.2	14,000	4.6	5.0
Engineering	48,600	15.0	46,900	15.3	16.8
Agricultural Sciences	14,800	4.5	14,200	4.6	5.1
Medical Sciences	9,000	2.8	18,600	6.1	6.6
Biological Sciences	58,900	18.2	45,100	14.7	16.2
Biochemistry#	**12,000**	**3.7**	**9,200**	**3.0**	**3.3**
Psychology	39,700	12.2	32,500	10.6	11.7
Clinical	**13,700**	**4.2**	**16,100**	**5.3**	**5.8**
Social Sciences	49,800	15.4	36,200	11.8	13.0
Nonscience/Nonengineering			18,100	5.9	
No Report			8,600	2.8	

+Percentages are based on the estimated number of individuals employed in science and engineering (N = 279,200).

*Includes postdoctoral appointees as well as full-time and part-time employed doctorates.

#Code 280 (biochemistry) from the broad field of chemistry has been merged with Code 540 from the broad field of biological sciences. The estimated number of Ph.D.s involved in this transfer is 300 for field of doctorate and 2,600 for field of employment.

The fields with the largest number of doctorate recipients were the biological sciences (18.2 percent), social sciences (15.4 percent), engineering (15.0 percent), and chemistry (14.4 percent). The fields employing the largest percentage of science/engineering Ph.D.s were essentially the same four fields, i.e., engineering (15.3 percent), biological sciences (14.7 percent), social sciences (11.8 percent), and chemistry (10.9 percent).

The difference between the number of individuals in a doctoral field and the corresponding employment field was large for some fields. In some cases the differences may be attributable to field definition. For example, the fields of mathematics and computer sciences have a great deal in common, and the similarities may account for some fraction of the net loss from Ph.D. field to employment field for mathematics (17,000 to 13,600) and the net gain in computer sciences (1,800 to 6,400).

The overlapping that occurs in the science fields may account for part of the apparent transition from Ph.D. field to field of employment.

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Appendix G helps to clarify this by showing the fine-field composition of the 11 broad science fields and gives the estimated number of doctoral scientists and engineers employed in each fine-field category.

With these precautions in mind, comparisons between doctoral fields and corresponding employment fields show that the net gains in medical sciences may have occurred largely as a result of the net loss in the field of biological sciences. Other fields showing large net losses from number of doctorate recipients to number employed were social sciences, chemistry, and physics/astronomy. A number of Ph.D.s in the sciences and engineering moved into nonscience employment fields and comprised 5.9 percent of the employed Ph.D. population. In general, there was a tendency to move from the more "pure" or theoretical degree fields or subfields to the more "applied" fields of employment.

FIELD MOBILITY OF EMPLOYED PH.D.S

Of the approximately 324,300 doctoral scientists and engineers in the United States who received their doctorates during the period January 1936 through June 1978 (Table 1.1), an estimated 305,900 were employed in February 1979. Table 1.2 shows the relationship between field of doctorate and field of employment for individuals with Ph.D.s in science and engineering.

The Ph.D. fields retaining the highest percentage of their doctorates in the corresponding employment fields were psychology (85.3 percent) and environmental sciences (84.2 percent). Those who left psychology tended to move into the nonscience fields (5.1 percent), whereas those departing environmental sciences moved most frequently into engineering (3.9 percent) or nonscience fields (3.1 percent). The field of physics/astronomy retained the smallest percentage of its Ph.D.s (60.2 percent). The Ph.D.s in physics/astronomy who moved out of their field for employment moved most frequently to engineering (16.1 percent).

The greatest mobility occurred between fields that are closely related, for example, mathematics, computer sciences, and engineering. Of the Ph.D.s in mathematics, 7.7 percent were employed in computer sciences, and 6.5 percent in engineering, while 12.2 percent of computer science Ph.D.s were employed in engineering. This mobility across fields was especially evident among the life sciences (agricultural, medical, and biological sciences). Doctorates in the biological sciences were frequently employed in the medical sciences (13.6 percent). Ph.D.s in the agricultural and medical sciences often switched to biological science employment (11.4 percent and 10.7 percent, respectively).

TABLE 1.2 Field Mobility of Employed Doctoral Scientists and Engineers, 1979

		Field of Doctorate										
1979 Field of Employment	Total Employed⁺	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
All Fields (N)	305,900	16,200	1,800	26,600	43,400	10,000	47,300	13,700	8,500	54,500	37,400	46,500
Mathematics	13,600	**72.9**	4.4	1.8	0.2	0.2	0.8	0.2	0.0	0.3	0.4	1.1
Computer Sciences	6,400	7.7	**74.8**	4.3	1.0	0.3	3.2	0.4	0.3	0.2	0.4	0.6
Physics/Astronomy	18,300	0.3	0.1	**60.2**	1.4	1.2	2.8	0.0	0.4	0.3	0.0	0.1
Chemistry	33,400	0.0	0.0	1.2	**71.8**	1.0	0.7	1.2	3.0	1.9	*	0.0
Environmental Sciences	14,000	0.6	0.0	4.4	2.4	**84.2**	3.2	2.4	0.5	2.2	*	0.6
Engineering	46,900	6.5	12.2	16.1	5.4	3.9	**80.3**	0.5	0.2	0.6	0.3	0.3
Agricultural Sciences	14,200	0.1	0.0	0.2	0.6	0.8	0.3	**74.9**	0.3	4.4	*	2.1
Medical Sciences	18,600	0.6	0.5	1.8	3.8	0.4	0.7	1.3	**79.8**	13.6	2.1	1.7
Biological Sciences	45,100	2.8	0.0	1.4	4.9	2.2	0.8	11.4	10.7	**70.4**	1.3	0.5
Psychology	32,500	0.0	0.0	*	*	*	0.0	0.1	0.4	0.3	**85.3**	0.9
Social Sciences	36,200	1.2	1.3	0.5	0.2	0.7	0.8	2.0	0.3	0.4	2.2	**73.1**
Nonscience/Nonengineering	18,100	4.2	2.5	4.8	4.9	3.1	4.8	3.6	2.1	2.8	5.1	15.5
No Report	8,600	3.2	4.1	3.3	3.4	2.1	1.7	1.9	2.1	2.7	2.8	3.5

⁺Includes postdoctoral appointees as well as full-time and part-time employed doctorates.

*Less than 0.1 percent.

DEMOGRAPHIC CHARACTERISTICS BY FIELD OF DOCTORATE

In February 1979, nearly 90 percent of the 1936-1978 doctoral scientists and engineers in the United States were men (Table 1.3). The Ph.D. fields with the highest percentage of men were engineering (99.2 percent), agricultural sciences (97.2 percent), and physics/astronomy (97.1 percent). Although the number of women Ph.D.s in the sciences and engineering was small in all fields, women were more highly represented in the fields of psychology (25.7 percent), biological sciences (17.7 percent), medical sciences (15.8 percent), and social sciences (15.6 percent). As found in both the 1975 and 1977 surveys, the field of engineering continued to produce the fewest women doctorate recipients;

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only 0.8 percent of all Ph.D.s in engineering were women.[9]

Racial/ethnic minority groups (blacks, American Indians, Hispanics, and Asians) comprised nearly 9 percent of the doctoral population, with 6.6 percent being Asian.[10] The fields with the highest percentage of minority group members were engineering (16.5 percent), computer sciences (11.3 percent), and medical sciences (11.2 percent). However, the fields with the largest number of racial/ethnic minorities were engineering (8,000), biological sciences (4,700), and chemistry (4,100). The smallest proportions of racial/ethnic minority members were found in psychology (4.0 percent) and environmental sciences (4.5 percent), continuing a pattern observed in the 1975 and 1977 survey data.[11] This, however, is due to the fact that fewer Asians have Ph.D.s in these fields.

Although computer sciences continued to be the field with the highest percentage of Ph.D.s under 30 years of age (9.2 percent), the fields of psychology (1,600), biological sciences (1,500), and chemistry (1,100) had the largest numbers of doctorate recipients under 30 years of age. Computer sciences also was the field with the highest percentage of Ph.D.s under 40 years of age (82.4 percent), while agricultural sciences (65.3 percent), chemistry (61.6 percent), and environmental sciences (61.5 percent) had the highest percentages of doctoral recipients over 40 years of age.

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[9] In 1975 and 1977, it was estimated that 0.5 and 0.6 percent, respectively, of the Ph.D.s in engineering were women (National Research Council, Commission on Human Resources, Science, Engineering, and Humanities Doctorates in the United States, 1975 and 1977 Profiles (Washington, D.C.: National Academy of Sciences, 1976 and 1978)).

[10] It should be noted that these figures may reflect a bias due to the 3.4 percent nonresponse to the racial/ethnic question.

[11] In 1975, the percentages of minorities in the fields of psychology and environmental sciences were 2.7 and 2.8 percent, respectively (Doctoral Scientists and Engineers in the United States, 1975 Profile). In 1977, the percentages of minorities in the fields of psychology and environmental sciences were 2.7 and 3.6 percent, respectively (Science, Engineering, and Humanities Doctorates in the United States: 1977 Profile).

TABLE 1.3 Demographic Characteristics of Doctoral Scientists and Engineers by Field of Ph.D., 1979

Demographic Characteristics	All Fields	Field of Doctorate										
		Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Total Population (N)	324,300	17,000	1,800	27,700	46,600	10,400	48,600	14,800	9,000	58,900	39,700	49,800
Sex												
Male	88.8	92.1	93.3	97.1	93.3	95.4	99.2	97.2	84.2	82.3	74.3	84.4
Female	11.2	7.9	6.7	2.9	6.7	4.6	0.8	2.8	15.8	17.7	25.7	15.6
Racial/Ethnic Group												
White/Caucasian	87.9	86.7	85.7	87.7	88.8	93.1	80.5	87.9	85.5	89.3	91.8	89.3
Minority Group	8.8	8.2	11.3	7.4	8.8	4.5	16.5	8.8	11.2	7.9	4.0	7.3
Hispanic	0.8	0.8	1.1	0.5	0.7	0.5	0.6	1.0	1.4	0.8	1.0	0.8
Black	1.1	1.0	*	0.7	0.8	0.2	0.3	0.9	1.8	1.2	1.5	2.0
Asian	6.6	6.0	9.3	5.9	7.0	3.6	15.5	6.5	7.9	5.7	1.1	4.0
Amer. Indian	0.3	0.4	0.9	0.3	0.3	0.2	0.1	0.4	0.1	0.2	0.4	0.5
No Report	3.4	5.1	3.0	4.9	2.5	2.3	3.0	3.3	3.3	2.8	4.2	3.4
Age in 1979												
Under 30	2.4	3.4	9.2	1.7	2.4	1.8	2.1	0.8	3.0	2.5	4.1	1.5
30-34	16.7	17.7	32.3	14.8	15.0	15.8	15.6	12.3	17.3	19.0	21.9	13.7
35-39	23.4	28.0	40.9	25.8	20.9	20.9	24.3	21.5	22.0	22.5	22.2	24.8
40-44	16.6	17.3	12.9	18.7	16.0	17.3	22.5	16.1	15.7	14.5	13.4	15.3
45-49	12.2	11.4	1.7	12.5	12.2	16.9	13.1	15.6	12.5	10.6	11.4	12.2
50-54	10.1	6.7	1.9	10.3	10.8	8.3	9.0	10.9	12.1	11.3	10.1	10.4
55-59	8.1	5.9	1.1	7.7	8.9	8.4	8.0	9.7	7.5	7.5	8.1	9.3
60-64	5.3	5.2	0.0	4.5	8.0	4.6	2.9	6.7	4.5	5.8	4.3	5.9
Over 64	5.0	4.3	0.1	3.9	5.7	6.0	2.3	6.3	5.1	6.1	4.1	6.6
No Report	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.3
Median Age (Years)	41.8	39.7	35.5	41.5	43.1	42.8	41.2	44.3	41.9	41.5	40.1	42.7
Calendar Year of Ph.D.												
1936-1949	7.4	7.6	0.0	7.3	14.4	8.8	3.8	6.7	6.1	8.8	3.8	6.1
1950-1959	15.6	12.1	0.4	17.5	20.8	12.8	11.9	19.2	14.0	16.9	15.6	13.5
1960-1969	31.8	36.2	11.3	36.5	32.8	33.0	38.6	32.0	27.9	30.1	27.1	27.2
1970-1973	21.6	23.6	36.8	20.9	16.8	20.4	24.3	20.7	22.7	20.7	21.7	23.9
1974-1976	15.6	14.2	38.4	12.5	10.3	15.7	14.4	14.1	19.3	15.8	19.7	19.1
1977-1978#	7.9	6.4	12.9	5.3	4.8	9.3	7.1	7.3	10.1	7.6	11.9	10.2
Citizenship												
U.S.	92.4	91.9	85.9	89.3	92.4	92.7	86.7	92.9	92.1	93.9	97.8	93.9
Foreign##	7.3	7.8	14.1	10.5	7.5	7.3	13.1	7.0	7.6	5.9	1.7	5.6
No Report	0.3	0.3	0.0	0.2	0.1	*	0.2	0.1	0.3	0.3	0.5	0.5

#Excludes Ph.D.s awarded in July-December, 1978. See Appendix H for the demographic characteristics of Ph.D. scientists and engineers who received their degrees between July 1, 1978 and January 31, 1979.

##In view of the lack of a comprehensive sampling frame for foreign-earned doctorates in the United States, few additions of segment three cases have been made to the sample since the 1973 survey. Therefore, the number of S/E Ph.D.s who are foreign citizens may be somewhat underestimated.

*Less than 0.1 percent.

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Examination of data on the year the doctorate was awarded provides an indication of the relative growth of the science and engineering fields. Computer sciences, a relatively new Ph.D. field, has shown rapid growth over the past eight years (88.1 percent of the Ph.D.s graduated during the 1970-78 period). Outside of computer sciences, the fields of psychology (11.9 percent), social sciences (10.2 percent), medical sciences (10.1 percent), and environmental sciences (9.3 percent) all had relatively high proportions of recent (1977-1978) Ph.D. graduates. Chemistry had the smallest percentage of new Ph.D. graduates, with only 4.8 percent of its total graduated in 1977-1978.

Both computer sciences and engineering continued to have the highest percentages of foreign citizens (14.1 and 13.1 percent, respectively), whereas, the field of psychology had as few as 1.7 percent foreign citizens.

EMPLOYMENT STATUS BY FIELD OF DOCTORATE

Of the 324,300 doctoral scientists and engineers in the United States, approximately 285,400 (88.0 percent) were employed in full-time jobs (Table 1.4A). An additional 10,300 (3.2 percent) Ph.D.s in science and engineering reported that they were employed on a part-time basis, and 10,200 (3.1 percent) indicated they held postdoctoral appointments (i.e., fellowship, traineeship, research associateship, internship) in February 1979. An estimated 2,900 Ph.D.s (0.9 percent of the total population of science/engineering Ph.D.s were unemployed and seeking employment.[12] These four groups (full-time employed, part-time employed, postdoctoral appointees, and those unemployed who were seeking employment) constitute the labor force as defined in this report. Those Ph.D.s who indicated they were not employed and not seeking employment, those who were retired, or those who gave "other," or did not report their employment status were considered to be outside the labor force (15,500). Thus, the estimated number in the labor force in February 1979 is 308,800, or 95.2 percent of the total population of 1936-1978 Ph.D. scientists and engineers.

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[12] The unemployment rate is the percentage of Ph.D.s in the science/engineering labor force who were unemployed and seeking employment, 2,900/308,800 or 0.9 percent. Unemployment rates are shown in Table 10.

TABLE 1.4A Employment Status of Doctoral Scientists and Engineers by Field of Ph.D., 1979 (1936-1978 Graduates)

		Field of Doctorate										
1979 Employment Status	All Fields	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Total Population (N)	324,300	17,000	1,800	27,700	46,600	10,400	48,600	14,800	9,000	58,900	39,700	49,800
Employed Full-Time	88.0	91.7	96.1	90.5	87.3	90.8	94.4	89.2	85.2	81.2	85.6	89.1
Employed Part-Time	3.2	2.4	1.7	2.1	2.8	2.8	2.2	1.8	2.7	3.0	6.6	3.4
Postdoctoral Appointment[+]	3.1	1.0	1.5	3.4	3.1	2.1	0.7	1.9	6.5	8.4	2.1	0.9
Not Employed	5.2	4.3	0.7	3.8	6.4	3.8	2.4	6.7	5.5	7.0	4.9	5.6
Seeking Employment[#]	**0.9**	**0.4**	**0.0**	**0.9**	**1.0**	**0.5**	**0.5**	**0.8**	**1.0**	**1.1**	**1.1**	**1.1**
Not Seeking Employment	**1.1**	**1.1**	**0.7**	**0.7**	**1.1**	**0.5**	**0.5**	**0.5**	**1.8**	**1.7**	**1.6**	**0.8**
Retired	**3.2**	**2.9**	**0.0**	**2.2**	**4.4**	**2.3**	**1.4**	**5.3**	**2.7**	**4.2**	**2.2**	**3.8**
Other	0.3	0.2	0.1	0.1	0.1	0.1	*	0.3	0.2	0.3	0.4	0.6
No Report	0.3	0.3	0.0	0.1	0.3	0.4	0.2	0.2	0.1	0.2	0.4	0.4

[+] The percentages of postdoctoral appointees may be underestimated because information about foreign Ph.D.s who came to the U.S. for postdoctoral research or study is incomplete.

[#] Percentages are not unemployment rates because they are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, none of whom are part of the labor force. For unemployment rates, see Tables 1.9 and 1.10.

[*] Less than 0.1 percent.

Ph.D.s in computer sciences had the highest percentage of full-time employment (96.1 percent of the total population of Ph.D.s in computer sciences). Other fields with high percentages of full-time employment were engineering (94.4 percent), mathematics (91.7 percent), environmental sciences (90.8 percent) and physics/astronomy (90.5 percent). Biological scientists reported the lowest percentage in full-time employment (81.2 percent).

For the 1973-1978 Ph.D.s (101,100), similarities within fields exist for the highest and lowest percentages of full-time and part-time employed. Computer scientists reported the highest percentage in full-time employment (95.2 percent), and biological scientists reported the lowest percentage (69.0 percent). Psychology was the field with the highest percentage of part-time employed, 7.6 percent of the 1973-1978 doctorate recipients (Table 1.4B) and 6.6 percent of the 1936-1978 Ph.D.s (Table 1.4A).

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TABLE 1.4B Employment Status of Doctoral Scientists and Engineers by Field of Ph.D., 1979 (1973-1978 Graduates)

1979 Employment Status	All Fields	Field of Doctorate										
		Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Total Population (N)	101,100	4,700	1,300	6,700	9,500	3,300	14,500	4,100	3,400	18,100	16,100	19,400
Employed Full-Time	84.9	92.4	95.2	84.8	81.9	90.8	94.7	90.7	77.3	69.0	82.9	92.3
Employed Part-Time	2.9	2.3	1.5	0.6	1.6	2.0	1.1	2.0	2.0	2.0	7.6	3.1
Postdoctoral Appointment⁺	8.7	2.3	2.1	12.0	12.1	5.7	1.5	4.9	16.7	24.3	4.7	1.9
Not Employed	3.1	2.2	1.0	2.5	3.6	1.0	2.3	2.3	4.0	4.4	4.0	2.3
Seeking Employment[#]	**1.3**	**0.5**	**0.0**	**1.5**	**1.4**	**0.7**	**1.3**	**1.0**	**1.4**	**1.3**	**1.8**	**1.4**
Not Seeking Employment	**1.7**	**1.7**	**1.0**	**1.1**	**2.2**	**0.3**	**1.0**	**0.9**	**2.5**	**3.1**	**2.2**	**0.9**
Retired	*	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**0.1**	*	*	*
Other	0.1	0.0	0.1	*	0.3	*	*	0.0	0.0	0.1	0.4	0.2
No Report	0.3	0.9	0.0	0.0	0.5	0.5	0.4	0.0	0.0	0.1	0.3	0.2

⁺The percentages of postdoctoral appointees may be underestimated because information about foreign Ph.D.s who came to the U.S. for postdoctoral research or study is incomplete.

[#]Percentages are not unemployment rates becuase they are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, none of whom are part of the labor force. For unemployment rates, see Tables 1.9 and 1.10.

*Less than 0.1 percent.

The most apparent difference between the employment status of recent (1973-1978) doctorate recipients and the total (1936-1978) doctoral population occurred in the area of postdoctoral appointments (8.7 and 3.1 percent, respectively). The highest percentages of postdoctoral appointments were in the biological sciences: 24.3 percent for recent graduates and 8.4 percent for the total population of 1936-1978 graduates.

The fields having the highest percentages of retired science and engineering doctorates (Table 1.4A) were agricultural sciences (5.3 percent), chemistry (4.4 percent), and biological sciences (4.2 percent); fields that also had higher percentages of Ph.D.s in the upper age categories.

The percentages of Ph.D.s who were not employed and not seeking employment were similar for the total population and for recent graduates, with the exception of biological sciences (3.1 percent for recent Ph.D.s and 1.7 percent for the total population) and chemistry (2.2 percent and 1.1 percent, respectively). The highest percentages of Ph.D.s who were not employed and not seeking employment occurred in the fields of medical sciences, biological sciences, psychology, and chemistry.[13] This held

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[13] Note that these percentages are not unemployment rates since they refer to individuals who are not employed and not seeking employment. This group is outside the labor force. For unemployment rates see Table 1.10.

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true for both recent Ph.D.s and for the total population of Ph.D.s.

TYPE OF EMPLOYER BY FIELD OF DOCTORATE

There were an estimated 295,700 Ph.D.s in science and engineering who were employed in the U.S. in 1979. This figure includes those holding full-time or part-time positions, but excludes postdoctoral appointees. Table 1.5A shows the types of organizations reported by the 1936-1978 Ph.D.s as their principal employer in 1979.

TABLE 1.5A Type of Employer of Full-Time and Part-Time Employed Doctoral Scientists and Engineers by Field of Ph.D., 1979 (1936-1978 Graduates)

		Field of Doctorate										
1979 Type of Employer	All Fields	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Employed Population† (N)	295,700	16,000	1,800	25,600	42,000	9,700	47,000	13,400	7,900	49,600	36,600	46,100
Educational Institution	54.3	77.0	45.3	50.9	34.5	47.0	35.6	57.4	56.5	66.7	51.4	75.0
4-Year Coll/Univ/Med School	**52.2**	**74.7**	**45.3**	**49.6**	**32.2**	**45.9**	**35.4**	**55.7**	**55.7**	**64.4**	**46.3**	**72.9**
2-Year College	**1.4**	**1.9**	**0.0**	**1.0**	**1.8**	**0.9**	**0.2**	**1.5**	**0.7**	**2.0**	**1.7**	**1.5**
Elem/Secondary School	**0.7**	**0.4**	**0.0**	**0.3**	**0.4**	**0.1**	*****	**0.2**	**0.1**	**0.3**	**3.5**	**0.6**
Business/Industry#	27.6	14.6	44.5	30.3	54.9	25.1	50.3	19.8	21.0	13.4	18.7	8.0
U.S. Government	8.6	5.5	6.3	12.1	5.8	19.5	9.0	18.0	8.1	9.5	4.1	7.3
State/Local Government	1.9	0.3	0.0	0.5	0.4	3.8	0.4	2.3	3.3	2.3	4.9	2.8
Hospital/Clinic	3.0	0.2	0.0	1.1	1.1	*	0.1	0.3	6.4	3.6	15.6	0.2
Other Non-Profit Organization	3.3	1.9	2.7	4.4	2.6	2.9	3.8	1.5	3.1	2.4	4.0	4.2
Other	0.9	0.4	1.2	0.2	0.2	1.5	0.5	0.6	0.8	1.6	0.6	2.1
No Report	0.5	0.1	0.0	0.6	0.5	0.1	0.3	0.2	0.7	0.5	0.7	0.5

†Excluded from this table are 28,600 Ph.D.s who were postdoctoral appointees, were not employed, or did not report employment status.
#Includes self-employed.
*Less than 0.1 percent.

More than one-half (52.2 percent) of the doctoral scientists and engineers were employed by four-year colleges and universities in 1979, and just over one-fourth (27.6 percent) were working in business or industry. The federal government was the third largest employer of science and engineering Ph.D.s, with 8.6 percent of the total employed population.

For the fields of mathematics and social sciences, the majority of the Ph.D.s were employed by educational institutions (77 and 75 percent, respectively). For doctorate-level chemists, engineers, and computer scientists, more than 45 percent were working in the business and industry sector, and the patterns of their other employer categories were similar. The percentage of Ph.D.s who held jobs in the federal government was

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highest for environmental scientists and agricultural scientists, with 19.5 and 18.0 percent, respectively, of the Ph.D.s in these fields reporting the U.S. government as their principal employer.

Table 1.5B also contains data on the type of employers by field but it includes only those individuals who earned doctorates in the period 1973-1978. In general, the percentages of Ph.D.s holding jobs at four year colleges and universities were lower for recent graduates than for the 1936-1978 Ph.D.s. In agricultural sciences, chemistry, and physics, the percentages employed by colleges/universities were considerably lower for recent graduates than for the total group. However, in the field of computer sciences, medical sciences, and biological sciences, the percentages of four-year college/university employed Ph.D.s were nearly equal for both cohort groups.

Business/industry was the principal employer for large percentages of Ph.D.s in chemistry (65.2 percent), engineering (65.2 percent), and computer sciences (46.8 percent). The U.S. government employed the largest percentage of Ph.D.s in environmental and agricultural sciences (17.8 and 17.3 percent, respectively), whereas state/local government and hospital/clinics employed large percentages of Ph.D.s with degrees in psychology. This held true for both recent Ph.D.s and for the total Ph.D. group.

TABLE 1.5B Type of Employer of Full-Time and Part-Time Employed Doctoral Scientists and Engineers by Field of Ph.D., 1979 (1973-1978 Graduates)

		Field of Doctorate										
1979 Type of Employer	All Fields	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Employed Population⁺ (N)	88,700	4,400	1,200	5,700	7,900	3,100	13,900	3,800	2,700	12,900	14,600	18,500
Educational Institution	50.8	71.1	45.5	40.1	25.2	40.3	29.0	47.5	56.4	66.9	48.6	69.3
4-Year Coll/Univ/Med School	**48.2**	**65.3**	**45.5**	**39.6**	**23.8**	**39.4**	**28.9**	**44.2**	**55.9**	**64.0**	**42.3**	**66.6**
2-Year College	**1.6**	**4.8**	**0.0**	**0.5**	**1.2**	**0.9**	**0.1**	**3.3**	**0.5**	**2.7**	**1.5**	**1.7**
Elem/Secondary School	**1.1**	**1.0**	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**4.8**	**1.0**
Business/Industry[#]	28.0	17.5	46.8	38.0	65.2	29.6	57.8	29.1	19.3	13.9	15.4	8.6
U.S. Government	8.6	8.3	5.5	13.6	4.5	17.8	8.1	17.3	9.4	9.5	3.3	9.4
State/Local Government	3.1	0.1	0.0	0.1	0.8	6.5	0.8	2.4	4.2	2.6	6.7	4.5
Hospital/Clinic	4.4	0.4	0.0	1.7	1.3	0.1	*	0.0	6.4	3.3	20.8	0.3
Other Non-Profit Organization	3.9	1.8	2.1	6.4	3.0	4.2	3.6	3.4	3.7	2.1	4.3	5.5
Other	1.0	0.5	0.0	0.1	0.1	1.5	0.4	0.3	0.3	1.6	0.5	2.4
No Report	0.2	0.3	0.0	0.0	0.0	0.0	0.4	0.1	0.3	0.2	0.3	0.1

⁺Excluded from this table are 12,300 Ph.D.s who were postdoctoral appointees, were not employed, or did not report employment status.

[#]Includes self-employed.

*Less than 0.1 percent.

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PRIMARY WORK ACTIVITY BY FIELD OF DOCTORATE

In February 1979, approximately 30 percent of the employed science and engineering Ph.D.s were engaged primarily in teaching and 30 percent in research/development/design. Almost one-fourth (23.8 percent) of the employed Ph.D.s held managerial or administrative jobs (Table 1.6A); 14.3 percent of which involved R&D.

TABLE 1.6A Primary Work Activity of Full-Time and Part-Time Employed Doctoral Scientists and Engineers by Field of Ph.D., 1979 (1936-1978 Graduates)

1979 Primary Work Activity	All Fields	Field of Doctorate										
		Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Employed Population⁺ (N)	295,700	16,000	1,800	25,600	42,000	9,700	47,000	13,400	7,900	49,600	36,600	46,100
Teaching	29.9	53.6	28.1	22.6	20.6	28.2	19.6	19.4	21.5	29.7	27.1	52.1
Research/Development/Design	30.6	24.7	49.3	44.7	35.5	36.3	35.5	36.1	29.9	40.3	13.4	15.2
Management/Administration	23.8	14.4	18.3	23.7	32.0	21.8	31.9	27.8	29.4	18.4	19.0	19.6
of Research and Development	**14.3**	**5.9**	**13.0**	**17.6**	**25.6**	**14.2**	**23.2**	**15.9**	**16.9**	**10.7**	**5.5**	**6.1**
of Educational Programs	**5.7**	**6.3**	**4.5**	**2.8**	**3.0**	**4.2**	**4.7**	**8.6**	**7.3**	**4.9**	**6.9**	**9.5**
of Other Activities	**3.8**	**2.2**	**0.8**	**3.3**	**3.4**	**3.4**	**4.0**	**3.4**	**5.2**	**2.8**	**6.5**	**4.0**
Consulting/Professional Services	8.4	3.3	2.2	3.3	2.9	5.9	6.0	5.1	11.2	4.5	36.0	4.0
Writing/Editing	1.7	0.4	0.6	1.2	1.3	2.8	0.8	2.3	1.8	1.8	1.6	3.3
Marketing/Production/Inspection	2.3	0.9	0.0	1.6	4.5	1.6	3.5	5.4	1.4	2.1	0.6	1.1
Other	1.9	1.4	0.7	1.4	2.1	2.6	1.8	2.3	2.4	1.8	1.0	3.0
No Report	1.3	1.3	0.7	1.3	1.2	0.7	0.8	1.5	2.4	1.4	1.3	1.7

⁺Excluded from this table are 28,600 Ph.D.s who were postdoctoral appointees, were not employed, or did not report employment status.

With the exceptions of Ph.D.s in mathematics, social sciences, and psychology, research and development was the most frequently reported primary work activity of Ph.D.s in science and engineering. For Ph.D.s in the fields of mathematics and social sciences, over 50 percent were primarily engaged in teaching. For all other science and engineering fields, the percentage of Ph.D.s engaged in teaching ranged from approximately 20 to 30 percent. In psychology, which employed an estimated 36,700 Ph.D.s, as many as 36 percent were primarily engaged in consulting or in providing professional services.

Table 1.6B shows the percentage distribution of work activities for those scientists and engineers who earned doctorates in the period 1973-1978. In general, the distribution of Ph.D.s involved in teaching was similar, across fields, to the total employed Ph.D. population with the exception of physics/astronomy where 13.7 percent of the recent

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Ph.D.s indicated that teaching was their primary work activity compared with 22.6 percent of the total employed Ph.D. group. However, as expected, recent Ph.D.s were more frequently involved in R&D and less frequently engaged in management/adminstration. Overall, 30.6 percent of the total employed Ph.D. scientists and engineers were administrators (Table 1.6A) compared with only 17.8 percent of the 1973-1978 graduates (Table 1.6B).

TABLE 1.6B Primary Work Activity of Full-Time and Part-Time Employed Doctoral Scientists and Engineers by Field of Ph.D., 1979 (1973-1978 Graduates)

		Field of Doctorate										
1979 Primary Work Activity	All Fields	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Employed Population† (N)	88,700	4,400	1,200	5,700	7,900	3,100	13,900	3,800	2,700	12,900	14,600	18,500
Teaching	28.7	51.5	30.6	13.7	15.7	21.4	13.2	15.9	21.7	30.3	24.9	51.6
Research/Development/Design	35.9	29.2	49.1	58.0	52.0	46.5	51.8	40.9	38.6	46.6	14.5	17.0
Management/Administration	17.8	8.6	17.3	19.1	23.9	18.4	23.1	22.6	22.9	13.7	15.4	15.8
of Research and Development	**11.3**	**5.8**	**14.1**	**15.8**	**21.2**	**14.1**	**20.1**	**13.2**	**12.8**	**9.2**	**3.6**	**6.4**
of Educational Programs	**3.4**	**1.2**	**3.0**	**1.0**	**1.3**	**2.7**	**1.3**	**6.9**	**6.2**	**1.9**	**5.1**	**5.8**
of Other Activities	**3.1**	**1.5**	**0.2**	**2.2**	**1.4**	**1.6**	**1.7**	**2.5**	**3.9**	**2.5**	**6.7**	**3.6**
Consulting/Professional Services	11.1	3.9	1.0	4.1	1.3	6.1	7.6	6.5	10.0	4.0	41.5	5.4
Writing/Editing	1.7	0.3	0.9	1.0	0.4	3.9	0.9	3.7	1.9	1.8	0.9	3.4
Marketing/Production/Inspection	2.2	1.6	*	2.1	3.8	1.3	3.0	7.8	0.8	1.9	0.7	1.9
Other	1.8	2.9	*	1.5	1.4	2.5	0.5	1.9	3.2	1.2	1.0	3.4
No Report	0.9	2.0	1.1	0.5	1.5	*	*	0.8	0.9	0.4	1.2	1.4

†Excluded from this table are 12,300 Ph.D.s who were postdoctoral appointees, were not employed, or did not report employment status.
*Less than 0.1 percent.

In chemistry, engineering, and physics, the percentages of Ph.D.s who were working primarily in R&D were considerably higher for the recent graduates than for the total Ph.D. group. As many as 41.5 percent of the recent psychology doctorates were primarily engaged in consulting or providing professional services.

MEDIAN ANNUAL SALARY BY SEX, YEARS OF WORK EXPERIENCE, AND FIELD OF DOCTORATE

The median annual salary in 1979 for full-time employed doctoral scientists and engineers, excluding those in the U.S. military, was $29,200 (Table 1.7). Ph.D. engineers reported the highest median salary ($32,700). Mathematicians had one of the lowest median salaries ($26,200), along with biological scientists, social scientists, and psychologists, who had median salaries of between $26,600 and $27,100.

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TABLE 1.7 Median Annual Salaries* of Full-Time Employed Doctoral Scientists and Engineers by Sex, Years of Professional Work Experience, and Field of Ph.D., 1979 (in thousands of dollars)

Sex and Years of Professional Experience	All Fields	Field of Doctorate										
		Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
TOTAL$^+$	$29.2	$26.2	$28.4	$30.6	$30.8	$29.4	$32.7	$28.1	$30.9	$27.1	$26.6	$26.6
0-1	19.6				21.7					19.7		
2-5	21.8	19.9	22.4	22.5	24.4	22.5	26.4	21.1	24.3	20.2	20.1	19.8
6-10	25.5	23.3	28.2	27.7	27.4	25.2	30.0	25.3	28.5	24.1	23.5	23.5
11-15	29.7	26.3	31.4	30.4	30.7	30.2	34.1	28.3	33.3	27.6	28.0	27.1
16-20	31.8	29.9		31.5	33.1	33.0	35.3	30.3	36.0	30.9	30.5	29.2
21-25	34.6	33.9		37.3	35.3	36.6	36.9	32.7	36.9	33.5	34.3	30.7
26-30	36.9	35.9		40.5	40.3	37.6	38.7	32.0	36.6	35.3	34.9	35.9
Over 30	38.6	38.5		40.1	38.2	40.7	41.5	35.0	44.6	36.0	35.9	36.9
Male, TOTAL$^+$	30.0	26.6	28.5	30.6	31.3	29.7	32.7	28.3	32.8	28.2	28.0	27.4
0-1	19.7									19.9		
2-5	22.3	19.9	22.3	22.5	24.6	22.6	26.4	21.1	24.5	20.5	20.3	19.9
6-10	26.0	23.6	28.3	27.8	27.8	25.4	30.0	25.3	29.2	24.7	24.0	24.0
11-15	30.1	26.4	31.5	30.5	30.9	30.3	34.1	28.4	34.5	28.3	28.4	27.5
16-20	32.2	30.1		31.5	33.7	33.1	35.3	30.3	37.7	31.9	30.9	29.5
21-25	35.0	34.2		37.4	35.4	36.7	36.9	32.7	39.3	33.9	34.9	31.0
26-30	37.4	36.2		40.5	40.5	37.6	38.8	32.1	39.0	35.7	35.5	36.3
Over 30	39.1	39.1		40.1	38.5	40.9	41.5	34.9	45.3	36.7	36.1	37.5
Female, TOTAL$^+$	23.1	22.1	25.2	25.4	24.3	24.5	26.2	21.2	25.6	22.4	22.9	22.9
0-1	17.4											
2-5	19.7	19.8		22.1	22.2	19.5	24.6	20.3	23.1	18.3	19.7	19.5
6-10	22.0	20.6	24.6	23.2	22.7	23.7	25.6	20.6	23.3	21.1	22.5	21.3
11-15	25.1	22.9		26.7	24.6	24.5	27.0		26.2	24.0	26.3	24.7
16-20	27.2	24.9		29.2	28.0				26.5	25.8	28.8	28.0
21-25	28.9	26.4		32.0	26.9				30.5	29.3	30.3	25.7
26-30	29.3	29.1			27.8				29.2	30.0	30.0	27.7
Over 30	30.5	34.0			29.3					29.2	33.7	30.7

*Median salaries were computed only for Ph.D.s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust to a full-year scale. Medians were not calculated for cells with less than 20 cases reporting salary.

$^+$Includes those not reporting years of professional work experience.

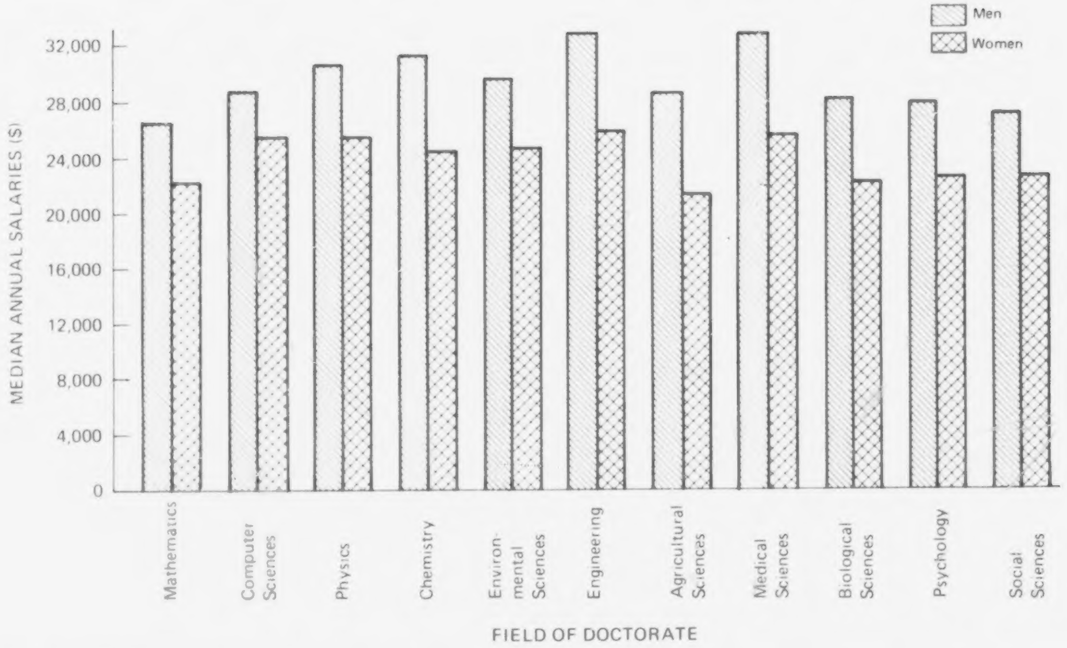

FIGURE 1.1 Median Annual Salaries of Full-Time Employed Ph.D.s in Science and Engineering by Field of Doctorate and Sex, 1979

Men received median annual salaries of $30,000, while women earned $23,100. Figure 1.1 shows that women reported lower median salaries than men in all fields. Among male Ph.D.s working in science or engineering fields, those Ph.D.s in medical sciences and engineering had the highest salaries ($32,800 and $32,700), respectively). For women, doctorate recipients in engineering had the highest estimated median salary ($26,200). Large salary differences between men and women occurred in the fields of medical sciences, where men earned $32,800 and women earned $25,600; agricultural science, where men earned $28,300 compared with $21,200 for women; and chemistry where men earned $31,300 compared with $24,300 for women.

With only a few exceptions, the median annual salaries of men and women increased as the number of years of professional work experience increased. The highest median salary ($45,300) was computed for male doctorates in medical sciences who had over 30 years of professional work experience. For women, however, the highest median annual salary was calculated for Ph.D.s in mathematics with over 30 years of experience.

MEDIAN ANNUAL SALARY BY SEX, TYPE OF EMPLOYER, AND FIELD OF DOCTORATE

Doctoral scientists and engineers employed in business and industry (including those self-employed) and those working for the federal government reported the highest median annual salaries, $33,800 and $33,400, respectively (Table 1.8). Ph.D.s employed by state and local government ($24,000) and two-year colleges ($24,600) had the lowest median salaries for all fields combined. Elementary/secondary schools and state/local government were the lowest paying employers for Ph.D.s in chemistry ($15,900 and $17,500 respectively). The highest median salaries were earned by Ph.D.s in psychology who were employed by business/industry ($36,700) and the federal government ($36,300) and for Ph.D.s in medical sciences who were employed by hospitals/clinics ($36,500).

A comparison of male and female salaries shows men earning higher salaries than women in all employer categories. In business and

TABLE 1.8 Median Annual Salaries* of Full-Time Employed Doctoral Scientists and Engineers by Sex, Type of Employer, and Field of Ph.D., 1979 (in thousands of dollars)

		Field of Doctorate										
Sex and Type of Employer	All Fields	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
TOTAL	$29.2	$26.2	$28.4	$30.6	$30.8	$29.4	$32.7	$28.1	$30.9	$27.1	$26.6	$26.6
Educational Institution	26.4	25.3	24.0	27.7	26.1	26.0	29.7	26.9	29.1	25.7	25.4	25.6
4-Year Coll/Univ/Med School	**26.4**	**25.4**	**24.0**	**27.9**	**26.4**	**26.1**	**29.7**	**26.9**	**29.2**	**25.8**	**25.1**	**25.5**
2-Year College	**24.6**	**20.6**		**22.4**	**24.8**					**24.2**	**28.5**	**27.9**
Elem/Secondary School	**25.5**				**15.9**						**28.0**	
Business/Industry⁺	33.8	31.3	32.1	33.1	33.4	33.6	35.0	29.6	35.7	33.0	36.7	33.6
U.S. Government, Civilian	33.4	32.0		33.4	34.2	35.3	35.6	32.0	31.5	31.4	36.3	34.4
State/Local Government	24.0				17.5	22.6		24.6	30.7	22.2	24.8	26.1
Hospital/Clinic	26.2				25.2				36.5	29.4	25.3	
Other Non-Profit Organization	30.7	33.0		31.7	30.4	28.8	35.4		33.5	28.2	25.4	28.3
Other/No Report	33.6									27.6		40.8
Male, TOTAL	30.0	26.6	28.5	30.6	31.3	29.7	32.7	28.3	32.8	28.2	28.0	27.4
Educational Institution	26.9	25.6	24.1	27.8	26.7	26.2	29.8	27.0	30.3	26.5	26.4	26.1
4-Year Coll/Univ/Med School	**27.0**	**25.7**	**24.1**	**28.0**	**26.9**	**26.3**	**29.8**	**27.0**	**30.4**	**26.6**	**26.2**	**26.1**
2-Year College	**24.7**				**24.9**					**24.1**		**28.1**
Elem/Secondary School	**26.2**										**28.5**	
Business/Industry⁺	34.1	32.0	32.2	33.3	33.6	33.9	35.0	30.0	35.8	34.0	40.0	33.9
U.S. Government, Civilian	33.8	32.2		33.4	34.5	35.4	35.6	32.0	32.5	31.8	36.7	34.9
State/Local Government	24.3					22.6		24.9	31.7	22.4	25.5	26.1
Hospital/Clinic	[illegible]								40.8	30.3	26.0	
Other Non-Profit Organization	31.9			31.8	30.8	28.9	35.4		39.5	29.5	28.6	29.8
Other/No Report	35.4									29.4		40.9
Female, TOTAL	23.1	22.1	25.2	25.4	24.3	24.5	26.2	21.2	25.6	22.4	22.9	22.9
Educational Institution	22.2	21.5	23.7	24.8	22.1	21.5	24.0	20.4	25.5	21.7	22.4	22.1
4-Year Coll/Univ/Med School	**22.1**	**21.6**	**23.7**	**24.9**	**22.0**	**21.3**	**23.9**	**20.6**	**25.5**	**21.6**	**22.1**	**22.0**
2-Year College	**23.9**				**24.0**					**24.4**	**23.4**	
Elem/Secondary School	**23.8**				**18.7**						**25.7**	
Business/Industry⁺	27.6	24.2		26.2	27.4	26.5	28.0	21.5		25.8	30.4	30.3
U.S. Government, Civilian	28.1			32.0	30.0	32.0			28.8	27.7	31.1	27.6
State/Local Government	21.5									20.4	21.8	25.6
Hospital/Clinic	22.8				18.9				23.8	22.6	22.7	
Other Non-Profit Organization	23.2				24.3					26.0	21.1	24.6
Other/No Report	24.8									23.2		

*Median salaries were computed only for Ph.D.s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust to a full-year scale. Medians have not been calculated for cells with less than 20 cases reporting salary.

⁺Includes self-employed.

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industry, men earned $34,100, whereas women received $27,600. Men employed by the federal government had a median salary of $33,800 compared with $28,100 for women. With the exception of the "other" employer category, business and industry and the federal government were the highest paying employers for both sexes.

For both male and female Ph.D.s, state and local government was the lowest paying employer when all Ph.D. fields were combined. Where more than 20 individuals reported salaries, female Ph.D.s in all science/engineering fields, except social sciences, earned the highest median salaries when employed by the federal government. Although the federal government also paid the male Ph.D.s well, it was not the highest paying employer across all science/engineering fields.

GEOGRAPHIC DIFFERENCES IN EMPLOYMENT STATUS

U.S. Total

The labor force of doctoral scientists and engineers in 1979 was approximately 308,800. Nationwide, Table 1.9 shows that 92.4 percent of the labor force were working full-time, whereas 0.9 percent were unemployed and seeking work. The remaining 6.7 percent of the labor force held part-time jobs or postdoctoral appointments. Of the 3.3 percent who were part-time employed, 0.6 percent were seeking full-time employment.

Regional Variations

Regionally, the East South Central states (Alabama, Kentucky, Mississippi, and Tennessee) and the West South Central states (Arkansas, Louisiana, Oklahoma, and Texas) reported the highest rates of full-time employment, 95.2 and 94.7 percent, respectively. The Pacific states (Alaska, California, Hawaii, Oregon, and Washington) and the New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) had the lowest percentage of the labor force working full-time--88.8 and 89.9 percent, respectively.

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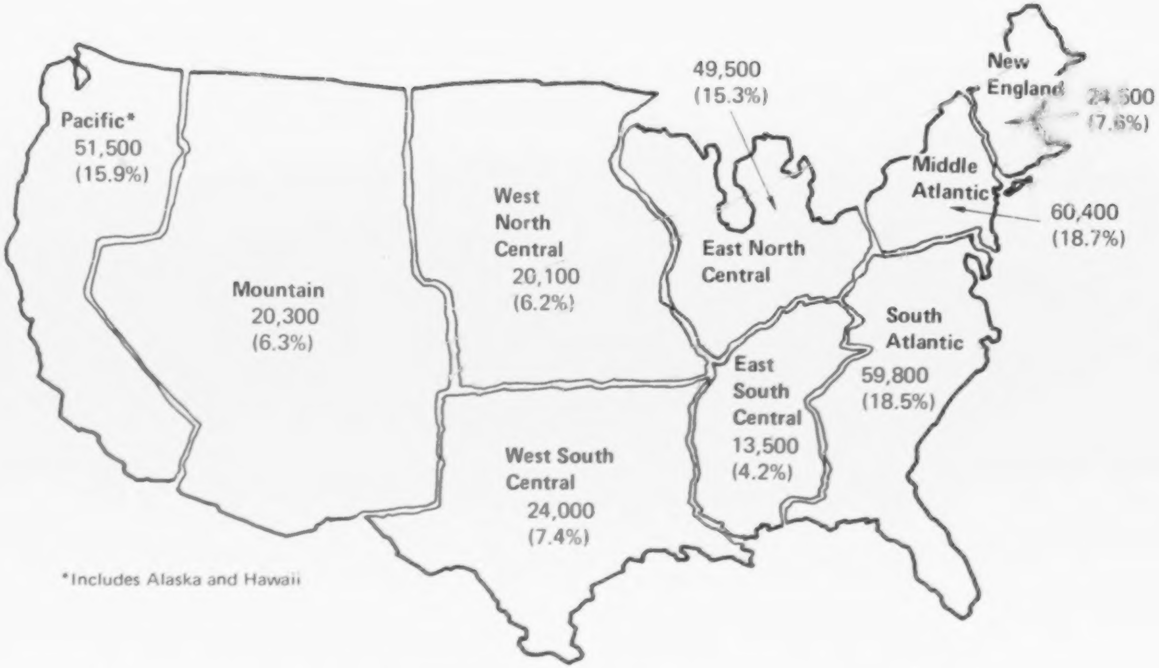
TABLE 1.9 Employment and Unemployment of Doctoral Scientists and Engineers in the U.S. Labor Force By Region,[+] 1979

		1979 Location (Region)									
1979 Labor Force Status	All Regions	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	U.S. Possessions
Total Ph.D. Labor Force* (N)	308,800	23,400	57,800	47,700	19,400	56,300	13,000	22,800	18,900	48,800	700
Employed Full-Time	92.4	89.9	93.2	93.8	93.5	92.9	95.2	94.7	92.2	88.8	97.1
Employed Part-Time	3.3	3.0	3.1	2.6	2.9	3.2	1.8	2.4	4.1	5.3	2.6
Seeking Full-Time Employment	**0.6**	**0.6**	**0.5**	**0.3**	**0.3**	**0.4**	**0.1**	**0.6**	**0.7**	**1.3**	**0.0**
Not Seeking F-T Empl./No Rept.	**2.8**	**2.4**	**2.6**	**2.3**	**2.6**	**2.9**	**1.7**	**1.8**	**3.4**	**4.0**	**2.6**
Postdoctoral Appointment	3.3	6.2	2.6	2.8	3.0	3.1	2.2	2.2	3.0	4.4	0.3
Unemployed and Seeking Empl.	0.9	0.9	1.1	0.8	0.7	0.8	0.8	0.7	0.7	1.5	0.0

[+] Regions by state are as follows: New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont); Middle Atlantic (New Jersey, New York, Pennsylvania); East North Central (Illinois, Indiana, Michigan, Ohio, Wisconsin); West North Central (Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, South Dakota); South Atlantic (Delaware, District of Cloumbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia); East South Central (Arkansas, Louisiana, Oklahoma, Texas); Mountain (Arizona, Colorado Idaho, Montana, New Mexico, Nevada, Utah, Wyoming); Pacific (Alaska, California, Hawaii, Oregon, Washington).

*Includes full-time and part-time employed, postdoctoral appointees, and those unemployed and seeking employment.


Pacific*
51,500
(15.9%)
Mountain
20,300
(6.3%)
West
North
Central
20,100
(6.2%)
West South
Central
24,000
(7.4%)
49,500
(15.3%)
East North
Central
East
South
Central
13,500
(4.2%)
South
Atlantic
59,800
(18.5%)
New
England
24,500
(7.6%)
Middle
Atlantic
60,400
(18.7%)

*Includes Alaska and Hawaii

FIGURE 1.2 Regional Distribution of the U.S. Population of Doctoral Scientists and Engineers and Percentage Distribution of the Total Ph.D. Population, 1979 (estimated population of 1936-1978 S/E Ph.D.s in the U.S. = 323,600 excluding 700 in U.S. possessions)

The highest percentages of part-time employed Ph.D.s were found in the Pacific and Mountain regions, 5.3 and 4.1 percent, respectively. The New England region had the highest percentage of Ph.D.s on postdoctoral appointments, 6.2 percent. The Pacific region had the highest unemployment rate--1.5 percent.

Figure 1.2 gives the distribution of Ph.D.s in the United States by region. The largest numbers of Ph.D.s are located in the Middle and South Atlantic regions (60,400 and 59,800, respectively), whereas the smallest number of Ph.D.s are found in the East South Central region--13,500 Ph.D.s.

EMPLOYMENT STATUS BY SEX AND FIELD OF DOCTORATE

Although less than one percent of the total labor force of doctoral scientists and engineers in the U.S. were unemployed and seeking work in 1979, conditions varied by sex. The unemployment rate for men was 0.7 percent compared with 2.8 percent for women.

Data in Table 1.10 include the unemployment rates for men and women Ph.D.s. Female Ph.D.s were more frequently unemployed and seeking employment than were male Ph.D.s This was especially true in the field of agricultural sciences where 9.4 percent of the female Ph.D.s were unemployed and seeking jobs compared with 0.6 percent of the men.

Of the approximately 275,900 male doctoral scientists and engineers in the labor force, 94.0 percent held full-time jobs. For women, however, only 79.2 percent of a labor force of about 32,900 were employed full-time, while 11.3 percent worked part-time. The percentage of Ph.D.s in full-time employment was greater for men than it was for women across all fields.

As many as 14.1 percent of the women who had Ph.D.s in the biological sciences were on postdoctoral appointments in 1979. Although only 7.9 percent of the male biologists were on postdoctoral appointments in 1979, biological sciences had the highest percentages of postdoctorates for both sexes across all Ph.D. fields.

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TABLE 1.10 Employment and Unemployment of Doctoral Scientists and Engineers in the U.S. Labor Force by Sex and Field of Ph.D., 1979

		Field of Doctorate										
1979 Labor Force Status/Sex	All Fields	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
TOTAL Labor Force*	308,800	16,300	1,800	26,800	43,800	10,000	47,600	13,800	8,600	55,100	37,900	47,100
Employed Full-Time	92.4	96.0	96.8	93.4	92.7	94.5	96.5	95.2	89.4	86.7	89.7	94.4
Employed Part-Time	3.3	2.6	1.7	2.2	3.0	2.9	2.3	1.9	2.8	3.2	6.9	3.6
Seeking Full-Time Employment	**0.6**	**0.4**	**0.0**	**0.2**	**0.5**	**0.7**	**0.3**	**0.6**	**0.3**	**0.4**	**1.2**	**1.0**
Not Seeking F-T Empl./No Rept.	**2.8**	**2.1**	**1.7**	**2.0**	**2.5**	**2.1**	**2.0**	**1.3**	**2.4**	**2.8**	**5.7**	**2.6**
Postdoctoral Appointment	3.3	1.1	1.5	3.5	3.2	2.2	0.7	2.0	6.8	8.9	2.2	0.9
Unemployed and Seeking Empl.	0.9	0.4	0.0	0.9	1.0	0.5	0.5	0.9	1.0	1.2	1.1	1.2
TOTAL Labor Force,* Male	275,900	15,100	1,700	26,100	41,100	9,500	47,200	13,500	7,300	46,100	28,400	39,900
Employed Full-Time	94.0	96.6	97.4	93.9	93.6	95.1	96.6	95.7	90.8	89.3	93.2	96.1
Employed Part-Time	2.4	2.1	1.4	1.9	2.6	2.5	2.2	1.8	1.6	1.9	3.9	2.5
Seeking Full-Time Employment	**0.4**	**0.4**	**0.0**	**0.1**	**0.4**	**0.6**	**0.3**	**0.6**	**0.1**	**0.2**	**0.8**	**0.7**
Not Seeking F-T Empl./No Rept.	**2.0**	**1.7**	**1.4**	**1.8**	**2.2**	**1.9**	**2.0**	**1.2**	**1.5**	**1.8**	**3.1**	**1.8**
Postdoctoral Appointment	2.9	1.1	1.2	3.4	2.9	2.0	0.7	1.9	6.8	7.9	1.9	0.7
Unemployed and Seeking Empl.	0.7	0.3	0.0	0.8	0.9	0.4	0.5	0.6	0.8	0.8	0.9	0.7
TOTAL Labor Force,* Female	32,900	1,200	100	700	2,700	500	400	300	1,300	9,000	9,500	7,200
Employed Full-Time	79.2	88.5	88.5	73.3	78.8	82.1	88.8	78.5	81.6	73.2	79.2	84.9
Employed Part-Time	11.3	8.6	6.6	14.1	9.6	10.5	6.5	5.0	9.4	9.5	15.9	9.3
Seeking Full-Time Employment	**2.0**	**1.3**	**0.0**	**2.6**	**1.9**	**2.7**	**1.9**	**0.0**	**1.6**	**1.5**	**2.3**	**2.4**
Not Seeking F-T Empl./No Rept.	**9.3**	**7.3**	**6.6**	**11.5**	**7.7**	**7.8**	**4.6**	**5.0**	**7.7**	**8.0**	**13.7**	**6.9**
Postdoctoral Appointment	6.6	0.7	4.9	9.5	8.3	4.9	2.2	7.1	6.8	14.1	3.0	2.3
Unemployed and Seeking Empl.	2.8	2.2	0.0	3.2	3.3	2.5	2.5	9.4	2.2	3.2	1.8	3.5

*Includes full-time and part-time employed, postdoctoral appointees, and those unemployed and seeking employment.

ACADEMIC POSITION BY COHORT, FIELD OF DOCTORATE, AND SEX

Table 1.11 shows the percentage distirbution of Ph.D. scientists and engineers who were employed by U.S. colleges and universities in 1979 by sex, field of Ph.D., year of Ph.D., and academic position.

In general, the proportion of science and engineering Ph.D.s with the academic rank of full professor was greater for men than for women. Also male Ph.D.s in the behavioral sciences attained the rank of full professor more frequently than any other Ph.D. field grouping. The percentages of Ph.D.s with the rank of associate and assistant professor were greatly dependent on year and field of Ph.D. for both men and women. For example, higher percentages of 1936-1959 and 1960-1969 Ph.D. women were associate professors than were men in the same cohort groupings except for life sciences in the 1960-1969 cohort where 39.3 percent of the men compared with 29.7 percent of the women were associate professors. However, for the 1970-1974 cohort, far greater percentages of men than women were associate professors. Larger percentages of women than men were assistant professors for all but the most recent cohort grouping where the reverse was true.

As would be expected, the percentages of postdoctoral appointments increased for both men and women across all fields for the more recent Ph.D.s (19.7 percent for men and 22.0 percent for women for the 1975-1978 Ph.D.s compared with 0.1 percent for men and 1.4 percent for women for the 1936-1959 cohort).

In general, for all fields combined, the percentage of female Ph.D.s in non-faculty positions is similar across all cohort groups, whereas the percentage of men in non-faculty positions appears to be significantly related to years since the Ph.D. was awarded (3.1 percent for the 1936-1959 cohort, 4.3 percent for the 1960-1969 cohort, 7.7 percent for the 1970-1974 Ph.D.s, and 11.0 percent for the 1975-1978 doctorates). These data demonstrate rather clearly the problem of lagging promotions for female doctorates in science and engineering.

TABLE 1.11 Academic Position of Doctoral Scientists and Engineers by Year of Ph.D., Field of Ph.D., and Sex, 1979

1979 Academic Position/ Year of Ph.D.	Field of Doctorate/Sex							
	All Fields		EMP		Life Sciences		Behav. Sciences	
	M	F	M	F	M	F	M	F
Total, 1936-1959 Ph.D.s	32,000	2,400	13,400	600	10,100	1,000	8,500	800
Faculty	92.4	84.1	88.5	80.3	95.0	82.8	95.4	88.1
Professor	**84.5**	**56.8**	**80.3**	**56.9**	**85.0**	**51.1**	**90.5**	**63.5**
Associate Professor	**6.9**	**21.7**	**6.8**	**17.4**	**9.2**	**24.5**	**4.4**	**21.1**
Assistant Professor	**0.6**	**4.5**	**0.7**	**3.9**	**0.6**	**6.4**	**0.4**	**2.6**
Instructor	**0.4**	**1.1**	**0.7**	**2.1**	**0.2**	**0.9**		**0.8**
Non-Faculty	3.1	6.7	6.0	7.3	1.5	8.4	0.5	4.3
Teaching Staff*	**0.2**	**1.3**	**0.3**	**2.2**	**0.2**	**1.1**	**0.1**	**1.1**
Research Staff+	**2.9**	**5.4**	**5.7**	**5.1**	**1.3**	**7.4**	**0.3**	**3.2**
Postdoctoral Appointment	0.1	1.4	0.2	1.1	0.1	2.2		0.6
Other/No Report	4.4	7.8	5.2	11.2	3.4	6.6	4.2	7.0
Total, 1960-1969 Ph.D.s	53,300	5,000	25,500	1,000	13,800	1,800	14,000	2,200
Faculty	91.9	82.3	89.1	76.7	92.3	79.1	96.5	87.5
Professor	**54.5**	**29.2**	**53.8**	**22.8**	**48.1**	**23.9**	**61.8**	**36.6**
Associate Professor	**33.5**	**34.8**	**31.4**	**34.4**	**39.3**	**29.7**	**31.6**	**39.2**
Assistant Professor	**3.5**	**15.5**	**3.2**	**14.6**	**4.8**	**22.5**	**2.9**	**9.9**
Instructor	**0.4**	**2.9**	**0.7**	**4.9**	**0.1**	**3.1**	**0.2**	**1.8**
Non-Faculty	4.3	7.9	6.5	10.1	3.0	11.2	1.3	4.2
Teaching Staff*	**0.3**	**1.1**	**0.3**	**2.0**	**0.4**	**0.4**	**0.3**	**1.2**
Research Staff+	**4.0**	**6.9**	**6.3**	**8.1**	**2.6**	**10.8**	**1.0**	**3.0**
Postdoctoral Appointment	0.8	1.8	0.9	2.5	1.3	2.5	0.2	0.9
Other/No Report	3.1	7.9	3.4	10.7	3.3	7.2	2.1	7.4
Total, 1970-1974 Ph.D.s	37,000	6,700	13,800	900	11,100	2,400	12,100	3,400
Faculty	83.7	80.8	79.5	72.1	83.6	75.8	88.7	86.9
Professor	**9.4**	**4.3**	**6.8**	**2.6**	**8.4**	**4.1**	**13.4**	**5.0**
Associate Professor	**41.6**	**28.0**	**40.6**	**25.0**	**35.8**	**19.5**	**48.0**	**34.9**
Assistant Professor	**31.8**	**44.4**	**31.4**	**39.3**	**37.9**	**47.5**	**26.7**	**43.7**
Instructor	**0.9**	**4.1**	**0.7**	**5.2**	**1.5**	**4.8**	**0.6**	**3.2**
Non-Faculty	7.7	8.4	11.0	14.1	7.1	11.5	4.3	4.5
Teaching Staff*	**0.8**	**1.3**	**0.4**	**1.2**	**0.4**	**0.5**	**1.7**	**1.8**
Research Staff+	**6.8**	**7.2**	**10.6**	**12.9**	**6.6**	**11.0**	**2.6**	**2.8**
Postdoctoral Appointment	3.3	5.3	3.8	7.1	4.8	8.4	1.3	2.5
Other/No Report	5.3	5.5	5.7	6.7	4.5	4.3	5.7	6.1
Total, 1975-1978 Ph.D.s	24,400	6,100	8,400	700	7,500	2,100	8,500	3,300
Faculty	64.0	64.8	59.4	58.1	51.8	44.1	79.2	79.7
Professor	**0.7**	**1.0**	**0.9**	**0.7**	**0.7**	**0.9**	**0.4**	**1.1**
Associate Professor	**6.3**	**7.7**	**7.5**	**5.0**	**4.1**	**7.3**	**6.9**	**8.6**
Assistant Professor	**53.7**	**51.3**	**48.0**	**45.9**	**43.7**	**32.3**	**68.1**	**64.7**
Instructor	**3.3**	**4.8**	**2.9**	**6.5**	**3.3**	**3.6**	**3.7**	**5.2**
Non-Faculty	11.0	7.3	17.2	11.7	6.3	8.9	9.0	5.2
Teaching Staff*	**1.3**	**1.2**	**1.7**	**0.7**	**0.9**		**1.4**	**2.2**
Research Staff+	**9.6**	**6.0**	**15.5**	**11.0**	**5.5**	**8.9**	**7.5**	**3.1**
Postdoctoral Appointment	19.7	22.0	19.2	26.1	37.6	42.4	4.4	7.9
Other/No Report	5.4	5.9	4.3	4.1	4.3	4.6	7.5	7.2

*Includes nonfaculty staff members whose primary work activity is teaching.

+Includes nonfaculty staff members whose primary work activity is basic research, applied research, development, or design.

NOTE: EMP = Engineering, Mathematics, Computer Sciences, Physics/Astronomy, Chemistry, and Environmental Sciences.
Life Sciences = Agricultural Sciences, Medical Sciences, and Biological Sciences.
Behavioral Sciences = Psychology and Social Sciences.

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TENURE STATUS BY FIELD OF PH.D. AND SEX

Nearly 60 percent of the academically employed science and engineering Ph.D.s held tenured positions in 1979 (Table 1.12). An additional 16.4 percent held tenure-track positions but were not yet tenured. By field, the highest percentages of tenured Ph.D.s were in mathematics (71.2 percent) and agricultural sciences (68.1 percent). Only 30.8 percent of the computer scientists held tenured positions, although 42.9 percent were in tenure-track positions. This reflects the large number of recent graduates in this field.

Compared with men, much smaller percentages of women held tenured positions, 35.2 percent versus 62.5 percent for all fields combined. Similar differences occur in each field. Women were more likely than men to hold non-tenure track positions (24.8 percent compared with 11.7 percent). In the fields of physics, chemistry, environmental sciences, and biological sciences, over 30 percent of the women were in non-tenure track positions.

Tenured Ph.D.s were granted tenure approximately six years after receiving their doctorate. Median years to tenure varied little among fields and ranged from just under five years in computer sciences and social sciences to over seven years in physics and chemistry.

For all fields combined and for those who were granted tenure, men and women earned tenure in substantially the same period of time. By field, women physicists and chemists required slightly more time to receive tenure. However, female agricultural scientists and medical scientists earned tenure somewhat sooner than men.

PH.D.S WORKING IN ENERGY-RELATED AREAS

Table 1.13 gives the distribution of Ph.D.s who were working in energy-related areas in 1979 by years of professional experience and government support status. More than twice as many Ph.D.s with 10 years or more of professional work experience were working in energy areas (26,300 Ph.D.s with 10 years of work experience compared with 12,300 Ph.D.s

TABLE 1.12 Tenure Status of Academically-Employed Doctoral Scientists and Engineers by Field of Ph.D. and Sex, 1979

		Field of Doctorate										
1979 Tenure Status	All Fields	Math	Comp	Phys/ Astrn	Chem	Envir	Engr	Agric	Med	Biol	Psych	SocSc
Total Academically Employed	166,900	12,400	800	13,700	15,600	4,700	17,100	7,900	4,900	37,000	18,200	34,600
Tenured	59.2	71.2	30.8	53.4	60.0	62.7	63.9	68.1	48.7	51.3	54.1	65.4
Tenure Track-Not Tenured	16.4	15.1	42.9	11.5	11.1	11.6	14.4	14.4	21.9	17.0	18.6	19.9
Non-Tenure Track	13.3	6.7	7.8	16.9	16.3	14.1	10.9	9.1	16.1	18.7	15.3	7.9
No Report	11.1	7.0	18.5	18.2	12.6	11.6	10.7	8.4	13.3	13.0	12.0	6.8
Years to Tenure	6.1	5.9	4.8	7.2	7.1	6.4	5.3	5.5	6.7	7.0	6.4	5.0
Total Academically Employed, Male	146,700	11,500	700	13,300	14,200	4,500	16,900	7,700	4,100	30,700	13,800	29,300
Tenured	62.5	73.1	32.4	54.0	62.5	64.4	64.2	69.2	51.4	56.2	60.1	69.3
Tenure Track-Not Tenured	15.2	14.4	42.6	11.5	11.0	11.6	14.3	14.1	21.3	16.0	15.7	17.9
Non-Tenure Track	11.7	5.9	6.4	16.5	14.6	12.7	10.9	8.5	15.0	15.6	13.0	6.6
No Report	10.5	6.6	18.6	18.0	11.8	11.3	10.6	8.2	12.3	12.1	11.2	6.1
Years to Tenure	6.1	5.9	4.9	7.2	7.08	6.3	5.3	5.5	6.8	6.9	6.4	5.0
Total Academically Employed, Female	20,200	900	100	400	1,400	200	200	200	800	6,300	4,400	5,300
Tenured	35.2	47.4	13.9	32.9	35.0	28.1	29.8	31.3	35.2	27.3	35.1	43.7
Tenure Track-Not Tenured	24.9	23.9	45.8	10.4	11.5	11.3	28.0	24.2	24.8	21.9	28.0	31.0
Non-Tenure Track	24.8	16.4	22.2	31.9	33.1	43.4	17.3	27.3	21.6	33.5	22.5	15.0
No Report	15.1	12.3	18.1	24.8	20.4	17.2	25.0	17.2	18.3	17.3	14.4	10.3
Years to Tenure	6.3	6.0		9.5	8.0	7.7	6.0	4.3	5.9	7.8	6.7	4.8

with less than 10 years of work experience). There was no consistent relationship between years of work experience and government funding status.

For both the Ph.D.s in the less than 10 years and 10 years or more work experience categories, the energy fields which attracted the most Ph.D.s were nuclear fission and fusion (27.6 percent with < 10 years of experience and 21.4 percent with ≥ 10 years of experience) and petroleum and natural gas (25.5 percent with < 10 years experience and 27.0 percent with > 10 years of experience).

TABLE 1.13 Ph.D.s Working in Energy or Fuel by U.S. Government Support Status and Years of Professional Work Experience, 1979*

	Federal Funding Status/Years Professional Experience							
	Total		Receiving Government Funds		Not Receiving Government Funds		No Report	
Energy	<10 Years	≥10 Years	<10 Years	≥10 Years	<10 Years	≥10 Years	<10 Years	≥10 Years
Total, All Energy Sources	12,300	26,300	5,900	11,900	5,800	13,800	600	600
Coal and Coal Products	14.6	14.4	16.1	17.0	14.5	12.0	2.3	18.0
Petroleum and Natural Gas	25.5	27.0	10.7	13.3	37.1	38.9	56.6	25.4
Nuclear (fission and fusion)	27.6	21.4	41.7	32.9	14.9	11.9	12.1	8.8
Hydroenergy	1.9	0.5	2.0	0.4	0.6	0.7	13.8	0.0
Solar (direct and indirect)	11.6	14.1	14.7	16.5	9.3	11.9	5.0	16.0
Geothermal	1.9	1.7	2.5	2.5	1.4	1.1	0.0	0.0
Other	13.2	16.5	9.4	15.6	17.5	16.8	10.1	26.6
Multiple Sources Cited	1.1	1.7	0.4	0.3	1.9	2.9	0.0	0.0
No Report	2.5	2.8	2.6	1.5	2.8	3.8	0.0	5.2

*Excludes those not reporting years of professional experience.

CHAPTER II

HUMANITIES

DOCTORAL POPULATION BY FIELDS

The Ph.D. fields covered by this chapter are defined as nine broad fields: history, art history, music, speech/theater, philosophy, "other humanities," English/American literature, classical languages, and modern languages and literature. Fine field components of these broad fields are given in the Degree and Employment Specialties List of Appendix A.

The fields of employment are defined in terms of these same broad fields. The field of employment data, unless otherwise stated, include Ph.D.s who were on postdoctoral appointments as well as those who were full-time and part-time employed; retired and unemployed humanities doctorates are excluded.

Table 2.1 gives the distribution of 1936-1978 humanities doctorates in the United States by field of doctorate and field of employment as of February 1979. Table 2.1 also gives the percentages of Ph.D.s who are employed in humanities fields by their field of Ph.D.

The population of humanists who earned their degrees between January 1, 1936 and June 30, 1978 was approximately 71,200. The fields with the largest number of doctorate recipients were English/American literature (28.0 percent) and history (25.7 percent), followed by modern languages (18.1 percent). Although the number of humanities doctorates employed was smaller than the number of individuals awarded Ph.D.s, the humanities fields with the highest percentages of employment remained English/American literature (21.6 percent) and history (18.0 percent). It should be noted, however, that 18.6 percent of the employed humanities doctorates were employed in non-humanities fields.

A comparison between field of doctorate and field of employment for the humanities shows that net losses occurred from receipt of Ph.D. degree to employment in all fields except "other humanities" (an increase of 600 Ph.D.s). There were substantial net losses in the fields of history and English/American literature (6,900 and 6,200, respectively).

One reason for the decline in numbers from Ph.D. field to employment field is the large number of humanities Ph.D.s who left their field of training to enter the education employment field (2,800). Appendix G provides further statistics on the estimated number of Ph.D.s in the humanities who were employed in each fine-field category and shows how the 18.6 percent in the non-humanities category was distributed.

TABLE 2.1 Distribution of Ph.D. s in the Humanities in the United States, 1936-1978 Graduates by Field of Doctorate and Field of Employment, 1979

	Field of Doctorate		Field of Employment		
	N	%	N*	% of Total Employed	% of Humanities-Employed+
All Fields (N)	71,200	100.0	63,400	100.0	48,600
History	18,300	25.7	11,400	18.0	23.5
Art History	1,700	2.5	1,500	2.3	3.0
Music	4,400	6.2	3,700	5.8	7.6
Speech/Theater	4,100	5.7	1,800	2.8	3.6
Philosophy	5,800	8.1	3,700	5.9	7.6
Other Humanities	2,300	3.2	2,900	4.6	6.0
English/American Languages and Literature	19,900	28.0	13,700	21.6	28.1
Classical Languages and Literature	1,800	2.5	1,000	1.6	2.1
Modern Languages and Literature	12,900	18.1	8,900	14.1	18.4
Nonhumanities			11,800	18.6	
No Report			3,000	4.7	

*Includes postdoctoral appointees as well as full-time and part-time employed doctorates.

+Percentages are based on the estimated number of individuals employed in the humanities (N = 48,600).

FIELD MOBILITY OF EMPLOYED PH.D.S

Of the 71,200 Ph.D.s in the humanities who received their doctorates from January 1936 through June 1978 (Table 2.1), approximately 64,400 or nearly 90 percent were employed in February 1979. Table 2.2 contains data on the relationship between field of doctorate and field of employment for individuals with doctorates in the humanities.

The Ph.D. fields retaining the highest percentages of their doctorates in the corresponding employment fields were music (89.0 percent) and art history (84.0 percent). These data, like those in Table 2.1, show relative stability from field of Ph.D. to field of employment. Not only did music and art history retain their graduates, but apparently these fields employed few doctorates from other humanities fields.

TABLE 2.2 Field Mobility of Employed Ph.D. s in the Humanities, 1979

		Field of Doctorate								
1979 Field of Employment	Total Employed^{+}	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
All Fields (N)	63,400	16,400	1,600	4,100	3,700	5,200	2,100	17,700	1,500	11,100
History	11,400	**67.3**	0.4	0.1	0.4	0.1	2.2	1.0	2.5	0.9
Art History	1,500	0.5	**84.0**	0.2	0.2	0.0	2.6	0.1	0.4	*
Music	3,700	0.0	0.3	**89.0**	0.0	0.0	0.4	0.0	0.0	0.4
Speech/Theater	1,800	*	0.8	0.0	**43.3**	0.1	1.5	0.6	0.0	0.1
Philosophy	3,700	0.2	0.0	0.0	0.0	**69.3**	1.5	0.0	2.3	0.1
Other Humanities	2,900	3.6	2.4	1.2	3.0	1.7	**40.6**	4.5	5.0	2.8
English/American Languages & Lit.	13,700	0.5	0.0	0.1	1.3	1.0	9.2	**73.1**	1.6	2.9
Classical Languages & Lit.	1,000	0.1	0.1	0.0	0.0	0.3	0.3	*	**61.6**	0.4
Modern Languages & Literature	8,900	0.2	0.1	0.1	0.2	0.2	14.8	1.2	2.8	**75.3**
Nonhumanities	11,800	22.1	6.5	5.0	48.1	23.3	23.4	15.8	18.3	11.6
No Report	3,000	5.6	5.3	4.3	3.5	4.1	3.6	3.8	5.4	5.5

$^{+}$Includes postdoctoral appointees as well as full-time and part-time employed doctorates.

*Less than 0.1 percent.

At the other extreme, "other humanities" and speech/theater retained the smallest percentages of their Ph.D.s (40.6 percent and 43.3 percent, respectively). Nearly half (48.1 percent) of the speech/theater majors entered employment fields outside the humanities. Ph.D.s in "other humanities" moved most frequently into non-humanities fields (23.4 percent) or modern languages (14.8 percent).

DEMOGRAPHIC CHARACTERISTICS BY FIELD OF DOCTORATE

Table 2.3 shows that approximately three-fourths (74.4 percent) of the humanities Ph.D.s in the United States in February 1979 were men. Women Ph.D.s were most highly represented in the fields of art history (43.3 percent) and modern languages (37.1 percent). The differences in the proportions of males and females were greatest in the fields of philosophy and history, in which 86.5 and 84.4 percent were men, respectively and 13.5 and 15.6 percent were women, respectively.

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TABLE 2.3 Demographic Characteristics of Ph.D.'s in the Humanities by Field of Doctorate, 1979

Demographic Characteristics	All Fields	Field of Doctorate								
		Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Total Population (N)	71,200	18,300	1,700	4,400	4,100	5,800	2,300	19,900	1,800	12,900
Sex										
Male	74.4	84.4	56.7	81.7	81.1	86.5	67.5	68.6	71.8	62.9
Female	25.6	15.6	43.3	18.3	18.9	13.5	32.5	31.4	28.2	37.1
Racial/Ethnic Group										
White/Caucasian	86.2	86.7	89.6	88.0	83.6	85.3	78.2	89.7	87.0	81.4
Minority Group	5.3	3.7	3.3	5.5	3.6	5.8	11.2	3.0	2.9	10.7
Hispanic	**2.3**	**1.2**	**0.6**	**0.6**	*	**0.9**	**2.9**	**1.4**	**0.4**	**7.8**
Black	**1.5**	**1.7**	**0.5**	**2.9**	**2.2**	**1.1**	**3.5**	**1.0**	**0.9**	**1.1**
Asian	**1.1**	**0.6**	**1.5**	**1.1**	**0.3**	**2.9**	**4.3**	**0.5**	**1.0**	**1.5**
Amer. Indian	**0.4**	**0.2**	**0.7**	**0.9**	**1.0**	**0.9**	**0.5**	**0.1**	**0.6**	**0.3**
No Report	8.6	9.6	7.2	6.5	12.9	8.9	10.6	7.3	10.1	7.9
Age in 1979										
Under 30	0.9	*	0.5	0.7	0.8	2.8	0.2	1.1	0.6	1.3
30-34	11.6	10.5	15.5	11.6	7.4	14.2	6.3	12.9	13.5	11.6
35-39	21.3	22.3	24.6	20.2	13.1	22.2	15.6	22.5	24.4	20.7
40-44	17.7	19.5	12.8	17.2	20.1	15.8	22.7	17.4	14.7	15.9
45-49	13.2	13.4	13.8	16.8	13.1	12.5	18.7	11.9	9.4	13.5
50-54	10.5	10.3	11.1	11.1	15.6	10.3	14.0	9.8	6.8	9.7
55-59	9.1	9.4	5.6	8.5	9.5	9.0	10.3	8.9	8.8	9.4
60-64	6.0	5.2	7.1	6.4	10.3	5.2	4.4	5.8	7.4	6.3
Over 64	8.1	7.8	7.2	6.7	8.0	6.1	7.1	8.2	12.1	9.3
No Report	1.7	1.7	1.7	0.9	2.0	1.9	0.7	1.4	2.2	2.3
Median Age (Years)	43.8	43.7	42.8	44.5	47.4	42.6	45.8	43.2	43.0	44.3
Calendar Year of Ph.D.										
1936-1949	7.1	7.2	3.9	3.0	5.8	6.9	4.5	7.1	15.9	8.5
1950-1959	13.6	15.1	13.5	11.3	18.4	14.7	9.4	12.4	13.1	13.1
1960-1969	28.8	29.9	25.4	24.8	38.0	28.3	26.6	29.9	30.8	24.9
1970-1973	23.9	23.7	22.7	24.2	23.7	23.3	29.7	24.1	22.2	23.6
1974-1976	18.3	17.1	21.4	23.1	8.3	18.7	22.2	18.6	13.1	20.4
1977-1978#	8.2	7.0	13.1	13.6	5.9	8.2	7.7	7.8	4.8	9.4
Citizenship										
U.S.	94.1	95.9	92.4	95.7	96.0	94.0	90.5	96.6	91.2	88.0
Foreign##	3.2	1.5	4.3	2.8	1.2	3.1	8.4	1.5	4.8	8.0
No Report	2.7	2.7	3.3	1.4	2.8	2.9	1.1	1.9	4.0	4.0

*Less than 0.1 percent.

#Excludes Ph.D.s awarded in July-December, 1978. See Appendix H for the demographic characteristics of Ph.D. humanists who received their degrees between July 1, 1978 and January 31, 1979.

##In view of the lack of a comprehensive sampling frame for foreign-earned doctorates in the United States, the number of humanities Ph.D.s who are foreign citizens may be somewhat underestimated.

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Members of racial/ethnic minority groups (i.e., blacks, American Indians, Asians, and Hispanics) comprised 5.3 percent of the humanities doctoral population. Fields with relatively high percentages of minority group members were "other humanities" (11.2 percent) and modern languages and literature (10.7 percent). The latter field also had the largest number of minorities, 1,400. Fewer than 100 minority Ph.D. recipients, however, were reported to be in the fields of art history and classical languages and literature.

As of February 1979 the median age of humanities doctorates was 43.8 years. Over 40 percent of the Ph.D.s in art history were under 40 compared with only 21.3 percent of the speech/theater Ph.D.s and 22.1 percent of the "other humanities" doctorates. Further analyses continue to show that "other humanities" and speech/theater were the fields with the oldest Ph.D.s.

The distribution of years in which the Ph.D.s were awarded indicates the relative growth of the humanities fields over the years. Just over half (50.4 percent) of the humanists received their degrees since 1970. The fields of music (60.9 percent), art history (57.2 percent) and "other humanities" (59.6 percent) have shown substantial growth in terms of overall percentages of Ph.D.s within the field since 1970. The fields with the slowest rates of growth since 1970 were speech/theater and classical languages and literature (37.9 and 40.1 percent, respectively). In terms of Ph.D. production, these fields have actually declined in number since 1970.

Only 3.2 percent of the humanities Ph.D.s in the United States in 1979 were foreign citizens.[14] These foreign citizens were most highly represented in "other humanities" (8.4 percent) and modern languages and literature (8.0 percent). In speech/theater, as may be expected, only 1.2 percent of the Ph.D.s were foreign citizens.

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[14] In view of the lack of a comprehensive sampling frame for foreign earned doctorates in the U.S., this percentage may be somewhat underestimated.

EMPLOYMENT STATUS BY FIELD OF DOCTORATE

Of the 71,200 Ph.D.s in the humanities in the United States, approximately 58,100 (81.6 percent) were employed in full-time jobs in February 1979 (Table 2.4A). An additional 4,800 (6.8 percent) doctorates in the humanities reported that they were employed on a part-time basis, and as few as 500 (0.7 percent) indicated they held postdoctoral appointments (i.e., fellowship, traineeship, research associateship, internship) in February 1979.

Those humanities Ph.D.s who were unemployed and seeking employment (1,400), together with doctorates employed full and part-time and those on postdoctoral appointments, constitute the labor force (64,800 or 91.0 percent of the total population of Ph.D. humanists). Those Ph.D.s who indicated they were not employed and not seeking employment, who were retired, or who did not report or gave "other" for their employment status constitute the remainder of the humanities population (6,400 or 9.0 percent of the total population of Ph.D. humanists).

TABLE 2.4A Employment Status of Ph.D. s in the Humanities by Field of Doctorate, 1979 (1936-1978 Graduates)

		Field of Doctorate								
1979 Employment Status	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Total Population (N)	71,200	18,300	1,700	4,400	4,100	5,800	2,300	19,900	1,800	12,900
Employed Full-Time	81.6	82.3	79.5	82.3	85.2	80.1	83.7	82.4	77.4	79.0
Employed Part-Time	6.8	6.5	8.5	9.3	5.2	9.6	4.9	6.3	7.6	6.4
Postdoctoral Appointment[+]	0.7	0.9	1.4	0.5	0.2	0.5	1.4	0.4	0.8	0.8
Not Employed	10.3	10.0	9.2	7.2	8.7	9.0	9.6	9.7	13.6	13.5
Seeking Employment[#]	**2.0**	**1.4**	**2.9**	**2.0**	**1.2**	**1.6**	**3.8**	**1.7**	**2.6**	**3.1**
Not Seeking Employment	**2.2**	**1.8**	**1.6**	**0.9**	**1.2**	**3.0**	**2.9**	**2.7**	**2.3**	**2.5**
Retired	**6.1**	**6.8**	**4.8**	**4.3**	**6.3**	**4.4**	**2.8**	**5.4**	**8.7**	**7.9**
Other	0.3	0.1	0.8	0.4	0.1	0.4	0.1	0.5	0.5	0.1
No Report	0.4	0.3	0.5	0.2	0.6	0.5	0.2	0.7	0.1	0.2

[+] The percentages of postdoctoral appointees may be underestimated because information about foreign Ph.D. s who came to the U.S. for postdoctoral research or study is incomplete.

[#] Percentages are not unemployment rates because they are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, none of whom are part of the labor force. For unemployment rates, see Tables 2.9 and 2.10.

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Ph.D.s in speech/theater reported the highest percentage of full-time employment in the humanities fields (85.2 percent for 1936-1978 doctorates), while only 77.4 percent of the Ph.D.s in classical languages and literature were employed on a full-time basis.

Relatively large percentages of philosophy (9.6 percent), music (9.3 percent), and art history (8.5 percent) Ph.D.s were employed part-time. Over 13 percent of the classical language and modern language Ph.D.s were not employed, with high proportions of retirees in both fields (8.7 and 7.9 percent, respectively).

TABLE 2.4B Employment Status of Ph.D.s in the Humanities by Field of Doctorate, 1979 (1973-1978 Graduates)

		Field of Doctorate								
1979 Employment Status	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Total Population (N)	25,400	6,000	800	2,100	900	2,000	1,000	7,100	500	5,000
Employed Full-Time	81.7	83.4	78.8	80.8	86.2	78.8	82.4	81.9	83.0	80.3
Employed Part-Time	9.4	9.2	9.6	14.0	9.2	11.8	5.8	8.3	7.2	9.0
Postdoctoral Appointment[+]	0.9	0.8	2.9	0.3	0.4	0.5	2.8	0.4	0.0	1.6
Not Employed	7.5	6.4	7.1	4.5	4.1	8.5	9.0	8.0	9.9	9.0
Seeking Employment[#]	**3.7**	**2.8**	**4.2**	**3.2**	**3.0**	**3.2**	**5.2**	**3.1**	**4.3**	**5.7**
Not Seeking Employment	**3.7**	**3.6**	**2.2**	**1.4**	**1.2**	**5.3**	**3.6**	**4.9**	**5.2**	**2.9**
Retired	**0.1**	**0.0**	**0.7**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**	**0.4**	**0.4**
Other	0.2	0.1	0.7	0.4	0.0	0.2	0.0	0.4	0.0	*
No Report	0.3	*	0.9	0.0	0.0	0.3	0.0	1.0	0.0	*

[+] The percentages of postdoctoral appointees may be underestimated because information about foreign Ph.D.s who came to the U.S. for postdoctoral research or study is incomplete.

[#] Percentages are not unemployment rates because they are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, none of whom are part of the labor force. For unemployment rates, see Tables 2.9 and 2.10.

*Less than 0.1 percent.

Table 2.4B contains data on the employment status of Ph.D.s who earned their degrees between 1973 and 1978. With the exception of classical languages and literature, there were similarities between total and recent cohorts in the percentages of Ph.D.s who were full-time employed. Overall, higher percentages of the recent Ph.D.s were part-time employed than were the 1936-1978 cohort (9.4 percent and 6.8 percent, respectively). This was also true across fields, with the one exception of classical languages and literature where the percentages of part-time

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employed for the two groups were similar and higher for the 1936-1978 Ph.D.s. The fields of music (14.0 percent) and philosophy (11.8 percent) had the highest rates of part-time employment for the 1973-1978 Ph.D.s. The percentages of Ph.D.s holding postdoctoral appointments were almost doubled for the recent Ph.D.s in the fields of art history, "other humanities," and modern languages and literature.

The percentage of humanities doctorates unemployed and seeking employment was relatively high for Ph.D.s in "other humanities" and modern languages and literature (3.8 and 3.1 percent, respectively) of the total group and 5.2 and 5.7 percent of the recent doctorate recipients. For the 1973-1978 group, the fields of philosophy and classical languages had the highest percentages of Ph.D.s who were unemployed and not seeking jobs -- 5.3 and 5.2 percent. For the total group, however, the highest percentages of doctorates who were unemployed and not seeking jobs were philosophers (3.0 percent) and "other humanities" Ph.D.s (2.7 percent).

It should be noted that these figures are not unemployment rates since they are based on the total population. The unemployment rate is the ratio of Ph.D.s who are unemployed and seeking to the number in the humanities labor force--the ratio of 1,400 to 64,800 or 2.2 percent Unemployment rates are shown in Table 2.10.

TYPE OF EMPLOYER BY FIELD OF DOCTORATE

An estimated 62,900 doctoral humanists were employed full-time or part-time in the United States in 1979. For all fields combined, an estimated 86.6 percent of these individuals were working at educational institutions, including 6.9 percent who reported two-year colleges or elementary and secondary schools as their principal employer (Table 2.5A).

With the exception of history and classical languages and literature, approximately 80 percent of the 1936-1978 Ph.D.s in each of the humanities fields were employed by 4-year colleges, universities, or medical schools. Business and industry attracted 5.6 percent of the humanities doctorates. English/American literature had the largest proportion of Ph.D.s (7.4 percent) working in business and industry.

TABLE 2.5A Type of Employer of Full-Time and Part-Time Employed Ph.D.s in the Humanities by Field of Doctorate, 1979 (1936-1978 Graduates)

		Field of Doctorate								
1979 Type of Employer	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Employed Population[+] (N)	62,900	16,300	1,500	4,000	3,700	5,200	2,000	17,700	1,500	11,000
Educational Institution	86.6	81.4	83.6	86.5	87.9	85.5	89.7	89.0	84.4	90.4
4-Year Coll/Univ/Med School	**79.6**	**72.9**	**82.9**	**79.4**	**81.1**	**79.4**	**82.2**	**82.8**	**76.2**	**83.8**
2-Year College	**4.4**	**5.6**	**0.7**	**4.7**	**5.2**	**4.7**	**5.9**	**4.3**	**1.0**	**2.9**
Elem/Secondary School	**2.5**	**2.9**	**0.1**	**2.4**	**1.5**	**1.4**	**1.5**	**1.9**	**7.2**	**3.7**
Business/Industry[#]	5.6	4.7	5.6	4.9	6.1	5.5	2.6	7.4	5.4	4.5
Government	2.6	5.3	1.3	0.7	1.7	2.2	2.4	1.8	1.3	1.4
Non-Profit Organization	3.4	5.2	0.5	6.7	3.0	5.0	3.4	1.1	7.3	2.2
Museum/Historical Society	0.5	1.1	7.2	0.1	0.1	0.0	0.4	0.0	0.0	0.1
Research Library/Archives	0.3	1.1	0.5	*	0.0	0.0	0.5	*	0.4	0.1
Other	0.2	0.1	0.2	*	0.4	0.6	0.5	*	0.0	0.1
No Report	0.9	1.0	1.0	0.9	0.8	1.2	0.5	0.8	1.2	1.2

[+] Excluded from the table are 8,300 Ph.D.s who were postdoctoral appointees, were not employed, or did not report employment status.
[#] Includes self-employed.
*Less than 0.1 percent.

Overall, only 2.6 percent of the humanities doctorates were employed by government (federal, state, and local), although 5.3 percent of the history Ph.D.s reported government employment. This finding also held true for the 1973-1978 Ph.D.s where only 3.8 percent of all fields reported government employment, but as many as 8.8 percent of the history Ph.D.s were so employed (Table 2.5B).

Table 2.5B shows the percentage distribution by type of employer for the 1973-1978 graduates. In comparison with the 1936-1978 humanities Ph.D.s, the recent doctorate recipients were less likely to be working in 4-year colleges and universities and more frequently employed in two-year colleges and elementary and secondary schools. The exception to this was for the speech/theater Ph.D.s. For both the 1936-1978 cohort and the 1973-1978 cohort, there were disproportionately higher percentages of history Ph.D.s working in government; art history doctorates working in museums/historical societies; and music Ph.D.s employed by non-profit organizations.

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TABLE 2.5B Type of Employer of Full-Time and Part-Time Employed Ph.D.s in the Humanities by Field of Doctorate, 1979 (1973-1978 Graduates)

		Field of Doctorate								
1979 Type of Employer	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Employed Population⁺ (N)	23,100	5,600	700	2,000	900	1,800	900	6,300	400	4,500
Educational Institution	82.0	70.7	83.7	80.8	90.4	80.0	90.4	85.6	87.3	88.2
4-Year Coll/Univ/Med School	**72.9**	**61.0**	**82.5**	**70.5**	**83.1**	**71.8**	**79.1**	**76.7**	**71.6**	**79.3**
2-Year College	**5.7**	**5.8**	**1.2**	**6.3**	**4.0**	**6.1**	**8.3**	**7.1**	**1.0**	**4.0**
Elem/Secondary School	**3.4**	**3.9**	**0.0**	**4.0**	**3.3**	**2.1**	**3.0**	**1.8**	**14.7**	**5.0**
Business/Industry#	8.6	11.2	6.4	5.3	6.6	9.2	2.0	10.0	4.7	6.8
Government	3.8	8.8	2.2	1.3	0.8	2.7	3.9	2.5	3.0	2.0
Non-Profit Organization	3.4	4.7	0.0	11.7	2.2	5.6	2.9	0.8	2.5	2.0
Museum/Historical Society	0.8	2.3	7.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1
Research Library/Archives	0.4	1.3	0.0	0.1	0.0	0.0	0.0	0.0	1.5	0.1
Other	0.1	0.4	0.0	0.0	0.0	0.1	0.3	*	0.0	0.0
No Report	0.9	0.5	0.6	0.5	0.0	2.4	0.4	1.1	1.0	0.7

⁺Excluded from this table are 2,300 Ph.D.s who were postdoctoral appointees, were not employed, or did not report employment status.
#Includes self-employed.
*Less than 0.1 percent.

PRIMARY WORK ACTIVITY BY FIELD OF DOCTORATE

Teaching was the primary work activity reported by nearly two-thirds (65.1 percent) of those humanities Ph.D.s who were employed full-time or part-time in February, 1979 (Table 2.6A). About 13 percent of those employed were engaged primarily in management and administration in 1979, while 5.4 percent held writing/editing positions.

By field, between 10 and 24 percent of the humanists listed management and administration as their primary work activity, the second most frequent work activity for humanists. For the field of English and American literature, more than 70 percent of those employed gave teaching as their primary work activity and an additional 11.9 percent indicated they were primarily engaged in management and administration.

Table 2.6B contains data on the primary work activities of Ph.D.s in the humanities who earned their doctorates in the period 1973-1978. In general, the employment activities of the recent graduates (Table 2.6B) did not differ greatly from those reported by the total 1936-1978 graduates (Table 2.6A). Over 70 percent of the recent Ph.D.s in speech/theater, English/American literature, classical languages and literature,

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and modern languages were engaged in teaching. Ten percent of the recent history Ph.D.s were primarily involved in research and about 15 percent were working in management and administration. Relatively high percentages of both the 1936-1978 and 1973-1978 music Ph.D.s were engaged in the performing arts.

TABLE 2.6A Primary Work Activity of Full-Time and Part-Time Employed Ph.D. s in the Humanities by Field of Doctorate, 1979 (1936-1978 Graduates)

		Field of Doctorate								
1979 Primary Work Activity	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Employed Population[+] (N)	62,900	16,300	1,500	4,000	3,700	5,200	2,000	17,700	1,500	11,000
Teaching	65.1	57.8	63.9	66.1	60.0	66.0	55.2	71.3	66.0	68.6
Research	4.7	8.3	4.9	2.9	1.9	4.5	5.3	1.7	5.8	5.7
Consulting/Professional Services	2.6	2.5	1.0	1.4	2.7	5.1	4.8	2.2	2.7	2.1
Management/Administration	13.2	15.1	10.9	12.0	18.4	12.3	23.7	11.9	11.6	10.1
Writing/Editing	5.4	6.8	4.6	1.1	2.7	4.9	3.3	7.6	4.1	3.2
Curatorial	0.7	0.8	6.7	0.4	0.0	0.0	0.4	0.7	0.4	0.4
Performing Arts	1.1	0.0	0.5	10.4	5.3	0.1	0.6	0.2	0.0	0.1
Other	3.6	4.2	3.5	2.4	5.6	3.5	2.9	2.5	4.5	4.2
No Report	3.7	4.5	4.0	3.2	3.4	3.6	3.7	1.8	4.8	5.6

[+] Excluded from this table are 8,300 Ph.D.s who were postdoctoral appointees, were not employed or did not report employment status.

TABLE 2.6B Primary Work Activity of Full-Time and Part-Time Employed Ph.D. s in the Humanities by Field of Doctorate, 1979 (1973-1978 Graduates)

		Field of Doctorate								
1979 Primary Work Activity	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Employed Population[+] (N)	23,100	5,600	700	2,000	900	1,800	990	6,300	400	4,500
Teaching	65.8	50.9	62.7	62.9	72.7	66.1	64.8	74.5	74.9	71.8
Research	4.3	10.0	6.4	2.6	1.0	1.8	3.3	1.0	5.2	4.2
Consulting/Professional Services	2.7	4.9	0.6	1.0	1.3	5.7	4.3	1.9	0.0	1.1
Management/Administration	10.4	14.9	8.5	9.1	7.6	8.8	20.1	7.1	9.2	9.5
Writing/Editing	5.3	6.8	3.1	1.2	4.0	6.1	3.2	7.3	2.0	3.4
Curatorial	1.3	1.9	9.7	0.8	0.0	0.0	0.0	1.4	0.0	0.7
Performing Arts	1.9	0.0	0.0	16.5	7.0	0.0	0.0	0.7	0.0	0.0
Other	5.7	8.4	4.9	2.7	6.3	7.6	3.0	4.4	4.7	5.3
No Report	2.6	2.3	4.2	3.0	0.0	3.8	1.2	1.8	4.0	4.0

[+] Excluded from this table are 2,300 Ph.D.s who were postdoctoral appointees, were not employed, or did not report employment status.

MEDIAN ANNUAL SALARY BY SEX, YEARS OF WORK EXPERIENCE, AND FIELD OF DOCTORATE

The median annual salary in 1979 for full-time employed Ph.D.s in the humanities was $22,900 (Table 2.7). By field, speech/theater Ph.D.s had the highest median salary, $25,600. There was little variation in median salaries for the other humanities fields.

For all fields combined, men had a median salary of $23,800 compared with $19,800 for women. Figure 2.1 shows that men also reported higher salaries in each of the humanities fields. The greatest salary difference between men and women was in the field of art history, where men's salaries exceeded women's by $5,700. The highest median annual salaries for both sexes occurred in the field of speech/theater where men had median salaries of $26,100 and women had salaries of $23,400.

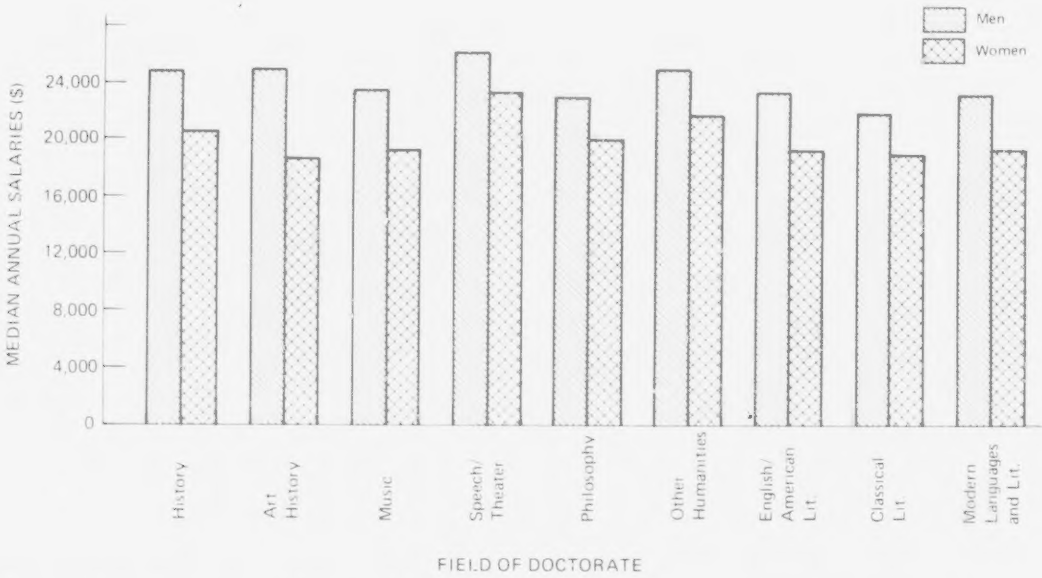

FIGURE 2.1 Median Annual Salaries of Full-Time Employed Ph.D.'s in the Humanities by Field of Doctorate and Sex, 1979

The data show a general increase in salary with years of professional work experience. This, however, is not uniformly true by field after 20 years of work experience, especially for fields such as music, speech/theater, philosophy, and "other humanities" where median salaries often decreased for Ph.D.s with increased experience (Table 2.7, Total Employed Population).

TABLE 2.7 Median Annual Salaries of Full-Time Employed Ph.D. s in the Humanities by Sex, Years of Professional Work Experience, and Field of Doctorate, 1979* (in thousands of dollars)

		Field of Doctorate								
Sex and Years of Professional Experience	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
TOTAL$^+$	$22.9	$23.9	$21.8	$22.6	$25.6	$22.5	$23.4	$22.3	$21.0	$22.1
0-1	15.2									
2-5	16.9	16.5	16.8	17.4	20.2	17.2		16.6	16.0	16.8
6-10	19.8	20.6	19.5	18.7	19.7	19.3	19.8	19.2	19.6	19.3
11-15	22.5	23.6	22.8	21.9	23.7	22.8	23.5	21.7	22.4	21.9
16-20	24.3	24.9	26.3	23.7	26.2	27.2	23.4	22.9	24.6	24.2
21-25	27.3	27.1	27.1	26.1	30.5	29.4	24.5	27.5		26.8
26-30	29.4	30.0		28.3	29.5	26.7	33.1	30.4	23.1	28.2
Over 30	30.9	31.2	29.8	26.7	30.1	35.5	29.2	31.3	26.8	31.6
Male, TOTAL$^+$	23.8	24.2	24.6	23.2	26.1	22.9	24.9	23.2	21.8	23.1
0-1	17.4									
2-5	17.1	16.4			21.5	17.2		17.1	15.9	17.1
6-10	20.1	20.8	20.1	18.8	19.8	19.3	20.6	19.8	20.0	20.0
11-15	22.7	23.9	23.7	22.3	24.4	22.8	23.1	22.1	22.5	21.9
16-20	24.7	25.0	30.0	23.8	26.2	28.0	23.6	22.9		24.5
21-25	28.2	26.9	26.7	26.7	30.7	29.6	25.3	28.9		27.3
26-30	30.2	30.3		28.6	29.5	26.9	33.6	32.0		29.6
Over 30	31.7	31.5		27.5	30.0		29.0	31.9		32.8
Female, TOTAL$^+$	19.8	20.4	18.9	19.3	23.4	19.8	21.7	19.4	19.0	19.5
0-1	13.3									
2-5	16.6	17.0	16.9			17.4		16.1		16.6
6-10	18.5	19.6	18.5	18.6	18.8	19.3	19.1	18.5	17.8	18.1
11-15	21.3	21.7	22.1	18.0	22.5	23.2	25.7	20.0		22.0
16-20	23.2	23.4					23.1	23.0		23.5
21-25	24.8	27.6		20.0				25.0		22.8
26-30	24.6	24.6						25.7		22.7
Over 30	25.9						29.3	23.2		26.3

*Median salaries were computed only for Ph.D.s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust for a full-year scale. Medians were not calculated for cells with fewer than 20 cases reporting salaries.

$^+$Includes those not reporting years of professional work experience.

MEDIAN ANNUAL SALARY BY SEX, TYPE OF EMPLOYER, AND FIELD OF DOCTORATE

The median annual salary for the 86.6 percent humanities Ph.D.s who were employed by educational institutions was $23,100 (Table 2.8). Humanists working in business and industry earned a median salary of $18,500, whereas those employed by government earned $21,400.

TABLE 2.8 Median Annual Salaries of Full-Time Employed Ph.D.s in the Humanities by Sex, Type of Employer, and Field of Doctorate, 1979* (in thousands of dollars)

		Field of Doctorate								
Sex and Type of Employer	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
TOTAL	$22.9	$23.9	$21.8	$22.6	$25.6	$22.5	$23.4	$22.3	$21.0	$22.1
Educational Institution	23.1	24.4	22.1	23.0	25.5	23.0	23.1	22.5	21.9	22.2
4-Year Coll/Univ/Med School	**23.1**	**24.3**	**22.1**	**22.9**	**25.2**	**22.8**	**23.2**	**22.5**	**22.2**	**22.1**
2-Year College	**24.6**	**26.3**						**22.0**		**23.7**
Elem/Secondary School	**22.7**								**13.8**	**23.5**
Business/Industry⁺	18.5	20.0			30.3			18.0		20.3
Government	21.4	22.4								23.4
Other/No Report	19.9	20.7	21.1	18.0						16.7
Male, TOTAL	23.8	24.2	24.6	23.2	26.1	22.9	24.9	23.2	21.8	23.1
Educational Institution	24.0	24.6	24.7	23.7	26.0	24.2	24.2	23.5	22.4	23.1
4-Year Coll/Univ/Med School	**24.0**	**24.6**	**24.7**	**23.6**	**25.6**	**24.0**	**24.8**	**23.4**	**22.6**	**23.0**
2-Year College	**26.4**	**26.5**								
Elem/Secondary School	**23.5**									
Business/Industry⁺	20.3									21.5
Government	23.1									
Other/No Report	20.6	20.9								
Female, TOTAL	19.8	20.4	18.9	19.3	23.4	19.8	21.7	19.4	19.0	19.5
Educational Institution	20.2	20.9	18.9	19.7	24.1	20.0	22.0	19.9	19.5	19.6
4-Year Coll/Univ/Med School	**20.1**	**20.8**	**18.9**	**19.5**	**23.9**	**19.8**	**21.4**	**19.9**	**19.8**	**19.4**
2-Year College	**22.2**									**23.2**
Elem/Secondary School	**16.7**									**23.1**
Business/Industry⁺	16.2									16.4
Government	18.1									
Other/No Report	12.5									

*Median salaries were computed only for Ph.D.s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust for a full-year scale. Medians were not calculated for cells with fewer than 20 cases reporting salaries.
⁺Includes self-employed.

Salary comparisons among types of educational institutions show that Ph.D.s in two-year colleges earned $24,600 compared with $23,100 for those employed in four-year colleges or universities, although the difference is barely statistically significant at the .95 level. By field of Ph.D., the highest median salaries were calculated for history Ph.D.s employed by two-year colleges ($26,300) and speech/theater Ph.D.s employed by four-year colleges/universities/medical schools ($25,200).

Comparison between the sexes show higher median salaries for men in all employer categories. For Ph.D.s employed by four-year colleges or universities, men earned a median salary of $24,000 as opposed to $20,100 for women. The greatest difference between salaries occurred

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in the field of art history where the annual median salary for men was $24,600 and $18,900 for women. The principal place of employment for these art historians was four-year colleges and universities. Due to the small number of Ph.D.s involved, the reader should interpret with caution the median salaries reported for both sexes in business and industry, state or local government, two-year colleges, and elementary/secondary schools.

GEOGRAPHIC DIFFERENCES IN EMPLOYMENT STATUS

U.S. Total

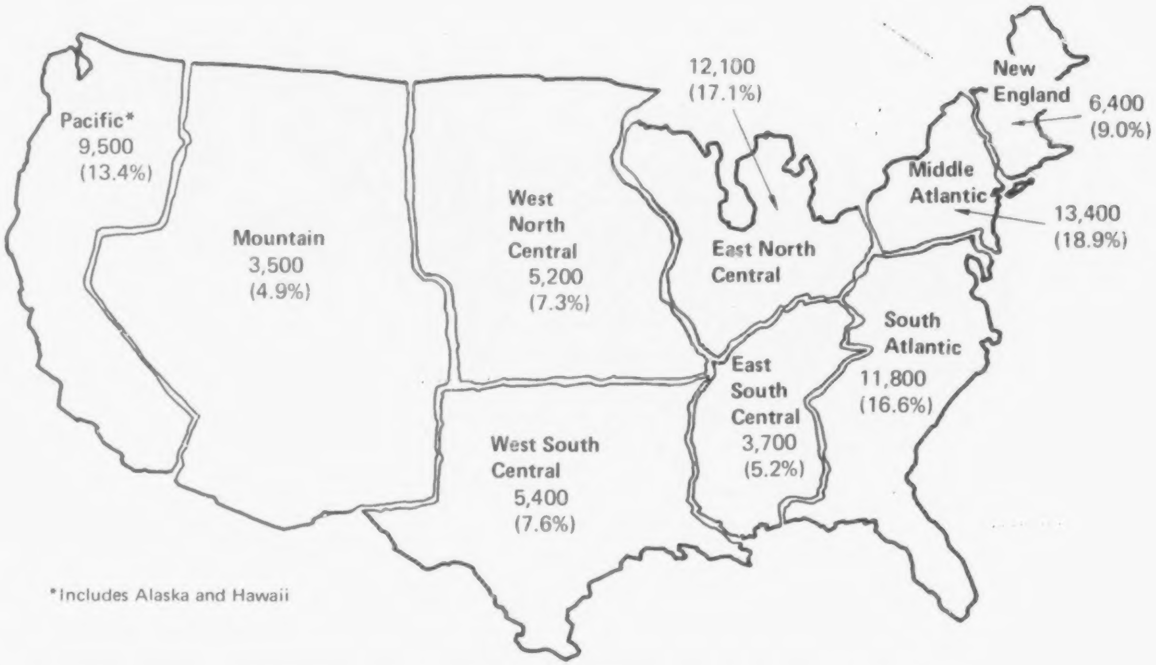
The labor force of doctorate recipients in the humanities in 1979 was approximately 64,800. Table 2.9 shows that, nationwide, 89.6 percent were working full-time and 2.2 percent were unemployed and seeking employment. The remaining 8.2 percent of the labor force held part-time jobs or postdoctoral appointments. Of the 7.5 percent who were part-time employed, 2.9 percent were seeking full-time employment.

Regional Variations

On a regional basis, there were similarities in the percentages of humanities Ph.D.s who were full-time employed. The regions with the highest percentages of Ph.D.s working full-time were the East South Central states (Alabama, Kentucky, Mississippi, and Tennessee) and the West Central states (Iowa, Kansas, Minnesota, North Dakota, Nebraska, and South Dakota), 92.5 and 91.9 percent, respectively.

Similar to the findings for the science/engineering Ph.D. labor force, the highest percentage of part-time employed Ph.D.s were found in the Pacific region (Alaska, California, Hawaii, Oregon, and Washington), 9.4 percent, and the highest percentage of Ph.D.s on postdoctoral appointments, 1.8 percent, were in the New England region (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont).

The New England states had the highest unemployment rate, 3.6 percent, whereas only 1.0 percent of the Ph.D.s in the South Atlantic


Pacific*
9,500
(13.4%)
Mountain
3,500
(4.9%)
West
North
Central
5,200
(7.3%)
West South
Central
5,400
(7.6%)
12,100
(17.1%)
East North
Central
East
South
Central
3,700
(5.2%)
South
Atlantic
11,800
(16.6%)
Middle
Atlantic
13,400
(18.9%)
New
England
6,400
(9.0%)

*Includes Alaska and Hawaii

FIGURE 2.2 Regional Distribution of the U.S. Population of Humanities Doctorates and Percentage Distribution of the Total Ph.D. Population, 1979 (estimated population of 1936-1978 Humanities Ph.D.s in the U.S. = 71,000 excluding 200 in U.S. possessions)

states (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia) were unemployed.

Figure 2.2 gives the distribution of humanities Ph.D.s in the United States by region. The largest number of Ph.D. humanists (13,400) are located in the Middle Atlantic states (New Jersey, New York, and Pennsylvania), whereas, the smallest number (3,500) are found in the Mountain states (Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming).

TABLE 2.9 Employment and Unemployment of Humanities Ph.D.s in the U.S. Labor Force by Region,[+] 1979

		1979 Location (Region)									
1979 Labor Force Status	All Regions	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	U.S. Possessions
Total Ph.D. Labor Force[#] (N)	64,800	5,900	12,200	11,200	4,600	10,800	3,200	5,200	3,100	8,400	200
Employed Full-Time	89.6	87.2	88.2	89.6	91.9	90.9	92.5	91.1	92.8	87.4	94.3
Employed Part-Time	7.5	7.4	8.5	8.3	4.9	6.8	5.8	7.0	4.2	9.4	0.0
Seeking Full-Time Employment	**2.9**	**2.3**	**3.5**	**3.2**	**1.1**	**3.1**	**2.0**	**3.5**	**2.1**	**3.3**	**0.0**
Not Seeking F-T Empl./No Rept.	**4.5**	**5.1**	**5.0**	**5.1**	**3.8**	**3.7**	**3.7**	**3.4**	**2.0**	**6.1**	**0.0**
Postdoctoral Appointment	0.7	1.8	0.3	0.3	1.2	1.4	0.1	0.1	*	0.8	4.4
Unemployed and Seeking Empl.	2.2	3.6	2.9	1.8	2.0	1.0	1.6	1.9	3.0	2.3	1.3

[+] Regions by state are as follows: New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont); Middle Atlantic (New Jersey, New York, Pennsylvania); East North Central (Illinois, Indiana, Michigan, Ohio, Wisconsin); West North Central (Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, South Dakota); South Atlantic (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia); East South Central (Arkansas, Louisiana, Oklahoma, Texas); Mountain (Arizona, Colorado Idaho, Montana, New Mexico, Nevada, Utah, Wyoming); Pacific (Alaska, California, Hawaii, Oregon, Washington).

[#] Includes full-time and part-time employed, postdoctoral appointees, and those unemployed and seeking employment.

*Less than 0.1 percent.

EMPLOYMENT STATUS BY SEX AND FIELD OF DOCTORATE

Table 2.10 shows that, for the total labor force of humanities Ph.D.s (64,800), the fields of speech/theater and history had the lowest rates of unemployment--1.4 and 1.5 percent, respectively. Ph.D.s in "other humanities" reported a relatively high percentage of unemployment--4.1 percent. As many as 10.4 percent of the Ph.D.s in philosophy were employed on a part-time basis, of which only 3.2 percent were seeking full-time employment.

For the total as well as for the nine humanities doctoral fields, a comparison of employment status by sex shows that higher percentages of men than women were employed full-time, and higher percentages of women

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were employed on a part-time basis. The unemployment rate for women was over three times the rate for men (4.6 percent for women compared with 1.4 percent for men). The highest rate of unemployment for men was for Ph.D.s in "other humanities" (3.9 percent), whereas for women the highest unemployment occurred for Ph.D.s in modern languages and literature (7.6 percent).

TABLE 2.10 Employment and Unemployment of Humanities Ph.D.s in the U.S. Labor Force by Sex and Field of Doctorate, 1979

		Field of Doctorate								
1979 Labor Force Status/Sex	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng/ Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
TOTAL Labor Force*	64,800	16,700	1,600	4,200	3,700	5,300	2,100	18,100	1,600	11,500
Employed Full-Time	89.6	90.4	86.1	87.4	92.7	87.3	89.1	90.8	87.6	88.5
Employed Part-Time	7.5	7.2	9.3	9.9	5.7	10.4	5.3	6.9	8.5	7.1
Seeking Full-Time Employment	**2.9**	**3.2**	**2.8**	**5.6**	**1.4**	**3.2**	**1.6**	**2.3**	**3.0**	**3.1**
Not Seeking F-T Empl./No Rept.	**4.5**	**4.0**	**6.5**	**4.3**	**4.2**	**7.2**	**3.6**	**4.6**	**5.5**	**4.0**
Postdoctoral Appointment	0.7	0.9	1.6	0.6	0.2	0.6	1.5	0.4	0.9	0.9
Unemployed and Seeking Empl.	2.2	1.5	3.1	2.1	1.4	1.8	4.1	1.9	3.0	3.5
TOTAL Labor Force,* Male	48,700	14,200	900	3,400	3,100	4,600	1,400	12,600	1,200	7,300
Employed Full-Time	92.9	92.7	92.7	90.0	94.8	88.5	90.6	94.1	91.6	95.4
Employed Part-Time	5.2	5.1	4.9	8.1	4.0	9.5	3.9	4.4	5.2	3.3
Seeking Full-Time Employment	**2.0**	**2.2**	**0.9**	**4.7**	**0.8**	**3.1**	**1.4**	**1.3**	**2.2**	**1.5**
Not Seeking F-T Empl./No Rept.	**3.2**	**2.9**	**4.1**	**3.4**	**3.2**	**6.4**	**2.6**	**3.1**	**3.0**	**1.7**
Postdoctoral Appointment	0.6	1.0	0.9	0.5	0.1	0.4	1.6	0.3	1.0	0.2
Unemployed and Seeking Empl.	1.4	1.2	1.5	1.4	1.1	1.7	3.9	1.3	2.2	1.1
TOTAL Labor Force,* Female	16,100	2,500	700	800	600	700	700	5,500	400	4,200
Employed Full-Time	79.7	77.1	77.5	75.6	83.2	79.4	85.9	83.1	75.9	76.6
Employed Part-Time	14.5	18.9	14.9	18.2	13.3	16.4	8.1	12.9	18.2	13.7
Seeking Full-Time Employment	**5.8**	**8.6**	**5.3**	**9.7**	**4.2**	**4.2**	**2.2**	**4.8**	**5.4**	**5.9**
Not Seeking F-T Empl./No Rept.	**8.7**	**10.3**	**9.6**	**8.4**	**9.1**	**12.1**	**5.9**	**8.1**	**12.9**	**7.8**
Postdoctoral Appointment	1.2	0.7	2.4	0.9	0.7	1.8	1.3	0.7	0.7	2.1
Unemployed and Seeking Empl.	4.6	3.3	5.2	5.3	2.7	2.4	4.6	3.3	5.1	7.6

*Includes full-time and part-time employed, postdoctoral appointees, and those unemployed and seeking employment.

ACADEMIC POSITION BY COHORT, FIELD OF DOCTORATE, AND SEX

Table 2.11 shows the percentage distribution of doctorates in the humanities who were employed in U.S. colleges and universities in 1979 by sex, field of Ph.D., year of Ph.D., and academic position.

Among academically employed humanists who had earned their degrees between 1936 and 1959, as many as 96.7 percent of the men and 82.6 percent

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of the women held faculty positions. In this cohort, men more frequently than women held the rank of full professor (87.9 percent for men and 63.9 percent for women), whereas women were more likely than men to be associate professors (8.0 percent for men and 15.6 percent for women).

Within the 1960-1969 cohort, the most populous cohort, nearly equal percentages of men and women held faculty positions. A little over half of the men were full professors (54.9 percent) compared with 40.5 percent of the women. In history, however, only 29.5 percent of the women were full professors, while, nearly 50 percent were associate professors.

The greatest discrepancy between the sexes occurred for the 1970-1974 Ph.D.s where 18.0 percent of the men reported that they held full professorship appointments, compared with 6.6 percent of the women who reported full professorship rank (Table 2.11). For this cohort, higher percentages of men than women across all humanities fields held associate professor rank, and higher percentages of women than men were assistant professors.

Men who earned their doctorates in English or history between 1970 and 1974 had a much higher percentage at the full professor ranking than did women in these field and cohorts; 15.1 percent of the men compared with 1.7 percent of the women in English and 31.1 percent for men compared with 11.9 percent for women in history. While approximately the same proportion of men and women held assistant professorships in English, higher percentages of women than men held that rank in the other humanities fields.

With few exceptions, small percentages of the recent (1975-1978) Ph.D. recipients who were academically employed held nonfaculty positions or postdoctoral appointments. For women with degrees in "other languages" (classical and modern languages), 6.2 percent were on postdoctoral appointments.

TABLE 2.11 Academic Position of Humanities Ph.D.s by Year of Doctorate, Field of Doctorate, and Sex, 1979

1979 Academic Position/ Year of Ph.D.	Field of Doctorate/Sex									
	All Fields		Eng/Amer Lit		History		Other Lang.		Other Humn.	
	M	F	M	F	M	F	M	F	M	F
Total, 1936-1959 Ph.D.s	7,800	1,100	2,300	300	2,100	200	1,400	400	2,000	200
Faculty	96.7	82.6	98.1	80.1	97.6	79.7	96.7	82.9	94.3	88.4
Professor	**87.9**	**63.9**	**92.3**	**62.5**	**90.2**	**59.3**	**85.7**	**65.7**	**82.0**	**67.4**
Associate Professor	**8.0**	**15.6**	**5.8**	**11.7**	**7.4**	**20.3**	**10.4**	**14.6**	**9.6**	**18.2**
Assistant Professor	**0.3**	**2.2**	**0.0**	**2.9**	**0.0**	**0.0**	**0.6**	**2.5**	**0.9**	**2.9**
Instructor	**0.4**	**0.9**	**0.0**	**2.9**	**0.0**	**0.0**	**0.0**	**0.0**	**1.7**	**0.0**
Non-Faculty	1.0	2.4	1.5	0.6	1.2	0.0	0.0	5.2	0.8	2.9
Teaching Staff*	**0.6**	**1.2**	**1.5**	**0.0**	**0.0**	**0.0**	**0.0**	**2.8**	**0.8**	**1.7**
Research Staff⁺	**0.3**	**1.2**	**0.0**	**0.6**	**1.2**	**0.0**	**0.0**	**2.5**	**0.0**	**1.2**
Postdoctoral Appointment	0.2	2.6	0.0	5.3	0.0	0.0	0.0	2.5	0.9	1.7
Other/No Report	2.1	12.4	0.4	14.1	1.2	20.3	3.3	9.4	4.1	7.0
Total, 1960-1969 Ph.D.s	14,400	3,200	3,800	1,200	4,200	500	2,500	800	3,900	700
Faculty	94.1	91.1	93.5	90.0	95.9	89.5	93.7	93.0	92.9	91.7
Professor	**54.9**	**40.5**	**54.2**	**46.6**	**55.0**	**29.5**	**44.7**	**32.1**	**62.0**	**47.3**
Associate Professor	**34.9**	**37.8**	**32.5**	**29.5**	**38.5**	**48.8**	**45.7**	**46.1**	**26.6**	**34.6**
Assistant Professor	**3.6**	**9.8**	**5.4**	**9.0**	**2.4**	**9.4**	**2.4**	**13.2**	**3.7**	**7.3**
Instructor	**0.7**	**3.0**	**1.4**	**4.9**	**0.0**	**1.8**	**0.8**	**1.6**	**0.6**	**2.5**
Non-Faculty	0.5	0.9	0.3	1.2	0.0	1.1	0.7	0.2	1.2	1.2
Teaching Staff*	**0.4**	**0.7**	**0.0**	**1.2**	**0.0**	**1.1**	**0.7**	**0.2**	**1.2**	**0.3**
Research Staff⁺	**0.1**	**0.2**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.9**
Postdoctoral Appointment	0.9	1.2	0.3	1.5	2.2	1.8	0.2	1.2	0.4	0.4
Other/No Report	4.5	6.7	5.9	7.2	1.8	7.7	5.5	5.6	5.5	6.7
Total, 1970-1974 Ph.D.s	12,300	4,500	3,400	1,600	3,200	600	2,200	1,300	3,500	1,000
Faculty	93.2	87.2	92.0	89.7	91.5	86.6	97.2	86.7	93.4	83.9
Professor	**18.0**	**6.6**	**15.1**	**1.7**	**31.3**	**11.9**	**7.7**	**6.3**	**15.3**	**11.8**
Associate Professor	**43.6**	**39.6**	**39.5**	**47.2**	**36.8**	**36.4**	**50.8**	**34.2**	**48.9**	**36.4**
Assistant Professor	**30.2**	**38.0**	**37.5**	**39.3**	**21.5**	**32.4**	**37.3**	**43.0**	**26.7**	**32.6**
Instructor	**1.4**	**2.9**	**0.0**	**1.4**	[illegible]	**6.0**	**1.2**	**3.2**	**2.5**	**3.1**
Non-Faculty	1.0	2.3	1.4	1.5	1.9	2.8	0.0	2.2	0.6	3.6
Teaching Staff*	**0.5**	**1.8**	**1.4**	**1.5**	**0.0**	**2.8**	**0.0**	**1.1**	**0.5**	**2.7**
Research Staff⁺	**0.5**	**0.5**	**0.0**	**0.0**	**1.9**	**0.0**	**0.0**	**1.1**	**0.1**	**0.8**
Postdoctoral Appointment	0.1	0.4	0.0	0.0	0.0	0.0	0.4	0.2	0.2	1.5
Other/No Report	5.6	10.2	6.6	8.8	6.7	10.5	2.4	11.0	5.8	11.1
Total, 1975-1978 Ph.D.s	6,100	3,800	1,400	1,400	1,500	600	1,200	1,000	2,000	800
Faculty	86.4	82.8	82.7	86.3	82.3	73.9	93.0	78.8	88.3	89.2
Professor	**2.3**	**2.1**	**0.3**	**0.8**	**5.6**	**5.9**	**2.0**	**0.6**	**1.5**	**4.8**
Associate Professor	**18.6**	**7.4**	**14.9**	**7.3**	**21.7**	**3.9**	**13.8**	**6.1**	**21.6**	**11.8**
Assistant Professor	**57.7**	**60.0**	**60.0**	**60.9**	**42.7**	**44.7**	**75.4**	**66.1**	**56.9**	**61.7**
Instructor	**7.9**	**13.3**	**7.5**	**17.4**	**12.3**	**19.5**	**1.9**	**6.0**	**8.3**	**11.0**
Non-Faculty	1.5	2.6	4.7	2.4	0.0	6.2	0.7	1.4	0.8	1.9
Teaching Staff*	**0.8**	**1.9**	**2.4**	**2.4**	**0.0**	**2.9**	**0.3**	**0.9**	**0.4**	**1.5**
Research Staff⁺	**0.8**	**0.8**	**2.3**	**0.0**	**0.0**	**3.4**	**0.3**	**0.6**	**0.4**	**0.5**
Postdoctoral Appointment	1.0	2.0	2.0	0.0	1.5	0.5	0.3	6.2	0.4	1.3
Other/No Report	11.0	12.5	10.6	11.2	16.2	19.3	5.9	13.6	10.4	8.5

*Includes nonfaculty staff members whose primary work activity is teaching.

⁺Includes nonfaculty staff members whose primary work activity is basic research, applied research, development, or design.

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TENURE STATUS BY FIELD OF PH.D. AND SEX

For all academically employed Ph.D. humanists, two out of three (67.9 percent) held tenured positions in February 1979 (Table 2.12). An additional 14.7 percent held tenure-track positions but were not yet tenured. Ph.D.s in history had the highest percentage of tenured positions, 74.3 percent.

TABLE 2.12 Tenure Status of Ph.D.s in the Humanities by Field of Ph.D. and Sex, 1979

		Field of Doctorate								
1979 Tenure Status	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil	Other Humn	Eng. Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Total Academically Employed	53,200	12,900	1,300	3,400	3,200	4,400	1,800	15,400	1,200	9,600
Tenured	67.9	73.4	59.2	60.8	72.3	63.1	60.2	69.0	64.8	64.6
Tenure Track-Not Tenured	14.7	10.2	22.5	17.6	15.5	15.8	17.5	14.7	17.5	17.2
Non-Tenure Track	11.2	12.0	10.5	15.0	6.3	12.3	13.9	10.5	10.5	10.8
No Report	6.2	4.3	7.7	6.6	5.9	8.8	8.3	5.8	7.2	7.5
Years to Tenure	5.2	5.3	4.7	4.2	5.4	5.1	5.0	5.1	6.3	5.2
Total Academically Employed, Male	40,600	11,000	700	2,800	2,700	3,900	1,300	10,900	900	6,400
Tenured	73.8	77.4	69.4	63.8	75.1	66.6	64.3	77.2	73.6	72.8
Tenure Track-Not Tenured	12.8	9.4	19.0	17.6	14.4	15.0	13.3	12.0	14.8	14.9
Non-Tenure Track	8.4	9.2	5.3	13.3	4.9	10.5	13.2	7.0	6.3	7.0
No Report	5.0	4.1	6.3	5.2	5.6	7.9	9.2	3.8	5.2	5.3
Years to Tenure	5.2	5.3	4.4	4.2	5.5	5.0	5.1	5.2	6.1	5.3
Total Academically Employed, Female	12,600	1,900	600	600	500	500	500	4,500	300	3,200
Tenured	48.7	50.5	45.6	45.2	58.6	38.5	50.6	49.2	37.9	48.7
Tenure Track-Not Tenured	20.9	15.1	27.3	17.2	20.6	21.9	27.6	21.3	25.6	21.7
Non-Tenure Track	20.3	28.5	17.5	23.7	13.3	24.9	15.6	18.9	23.2	18.0
No Report	10.1	5.8	9.6	13.8	7.5	14.8	6.2	10.6	13.3	11.6
Years to Tenure	5.0	5.2	5.6	4.2	4.6	5.7	4.8	4.8	7.1	5.1

Men were much more likely to hold tenured positions than women. Nearly three-fourths (73.8 percent) of the men were tenured compared with only 48.7 percent of the women. One of every five women with a Ph.D. in the humanities did not hold tenure-track positions compared with less than ten percent of the men.

Both men and women earned tenure within approximately five years of receiving their doctorates. Time to tenure varied little among fields, although men and women in classical languages and literature took somewhat longer to become tenured. Men earned tenure in art history and music in a little more than four years after receiving their degrees. Women who earned doctorates in music and speech/theater received tenure within four to four and one-half years from graduation.

APPENDIX A

1979 SURVEY OF DOCTORATE RECIPIENTS

QUESTIONNAIRE AND SPECIALTIES LIST

OMB No. 099-RO294

1979 SURVEY OF DOCTORATE RECIPIENTS

CONDUCTED BY THE NATIONAL RESEARCH COUNCIL WITH THE SUPPORT OF THE NATIONAL SCIENCE FOUNDATION, THE NATIONAL ENDOWMENT FOR THE HUMANITIES, THE NATIONAL INSTITUTES OF HEALTH, AND THE DEPARTMENT OF ENERGY

NOTE: THIS INFORMATION IS SOLICITED UNDER THE AUTHORITY OF THE NATIONAL SCIENCE FOUNDATION ACT OF 1950, AS AMENDED. ALL INFORMATION YOU PROVIDE WILL BE TREATED AS CONFIDENTIAL AND USED FOR STATISTICAL PURPOSES ONLY. INFORMATION WILL BE RELEASED ONLY IN THE FORM OF STATISTICAL SUMMARIES OR IN A FORM WHICH DOES NOT IDENTIFY INFORMATION ABOUT ANY PARTICULAR PERSON. YOUR RESPONSE IS ENTIRELY VOLUNTARY AND YOUR FAILURE TO PROVIDE SOME OR ALL OF THE REQUESTED INFORMATION WILL IN NO WAY ADVERSELY AFFECT YOU.

If your name and address are incorrect, please enter correct information above. Include ZIP Code (79)

If there is an alternate address through which you can always be reached, please provide it on the line below.

C/O Number Street City State ZIP Code (80)

Please check the pre-printed information in questions 1 - 6 to be certain that it is correct and complete.

1. Date of Birth Mo. Day Year (10-14)	2. State or Foreign Country of Birth (15-16)	3. Citizenship 0 ☐ U.S.A. (17) 1 ☐ Non-U.S.A., specify country ______ (18-19)	4. Sex 1 ☐ M 2 ☐ F (20)

5. What is your racial background?
0 ☐ American Indian or Alaskan Native
1 ☐ Asian or Pacific Islander
2 ☐ Black
3 ☐ White
(21)

5a. Is your ethnic heritage Hispanic?
0 ☐ Yes
1 ☐ No
(22)

6. **List in the table below all collegiate and graduate degrees, excluding honorary degrees, that have been awarded to you. Please check the pre-printed information, including the number and name of the specialty, from the Degree and Employment Specialties List on page 4, to be certain it is correct and complete.**

Type of Degree	Granted Mo. Yr.	Major Field (Use Specialties List) Name Number	Institution Name City (or Campus) & State
Bachelor's			
Master's			
Doctorate			
Other, specify			

7. **What is your marital status?** 1 ☐ Married 2 ☐ Not married (including widowed, divorced) (10)
   a. **Do you have any children under 7 years of age?** ☐ Yes ☐ No
   b. **Do you have any children between 7 and 18 years of age?** ☐ Yes ☐ No (11)

8. **Are you physically handicapped?** 0 ☐ Yes 1 ☐ No If YES, enter number(s) from below ______ (12)
   1. Visual 2. Auditory 3. Orthopedic 4. Other, specify ______ (13-16)

9. **How many full-time equivalent years of professional work experience have you had?** ______ Year(s) (17-18)
   a. **How many full-time equivalent years, if any, involved teaching?** ______ Year(s) (19-20)

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10. **What was your employment status (includes postdoctoral appointment) during the week of FEBRUARY 11, 1979?** ☐ Enter number from below (21)

1. Employed full-time
2. Employed part-time

If you were employed part-time, were you seeking full-time employment? ☐ Yes ☐ No (22)

3. Postdoctoral appointment†

†Temporary appointment in academia, industry or government, the primary purpose of which is to provide for continued education or experience in research.

If you held a postdoctoral appointment, was it: ☐ Full-time ☐ Part-time (23)

4. Unemployed and seeking employment
5. Not employed and not seeking employment
6. Retired and not employed
7. Other, specify ____________________

If you selected categories 4, 5, or 6 in Question #10, you have completed the questionnaire. Please return this form in the enclosed envelope.

11. **From the Degree and Employment Specialties List on page 4 select and enter both the number and title of the employment specialty most closely related to your principal employment or postdoctoral appointment during the week of FEBRUARY 11, 1979. Write in your specialty if it is not on the list.**

____

Number Title of Employment Specialty (24-26)

12. **If you were employed full-time during the week of FEBRUARY 11, 1979 in a specialty field other than your field of Ph.D., what was the MOST important reason for being in that position?** ☐ Enter number from below (27)

1. Preferred position outside Ph.D. field
2. Promoted out of position in Ph.D. field
3. Better pay
4. Locational factors
5. Position in Ph.D. field not available
6. Other, specify ____________________

13. **Please give the name of your principal employer (organization, company, postdoctoral institution, etc. or, if self employed, write "self") and actual place of employment during the week of FEBRUARY 11, 1979.**

____

Name of Employer (28-33)

____

Number Street

____

City State ZIP Code (34-38)

14. **Which category below best describes the type of organization of your principal employment OR postdoctoral appointment during the week of FEBRUARY 11, 1979?** ☐ Enter number from below (39-40)

1. Business or industry (including self-employed)
2. Junior college, 2-year college, technical institute
3. Medical school (including university affiliated hospital or medical center)
4. 4-Year college
5. University, other than medical school
6. Elementary or secondary school system
7. Private foundation
8. Museum or historical society
9. Research library or archives
10. Hospital or clinic
11. U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA
12. U.S. government, civilian employee
13. State government
14. Local or other government, specify: ____________________
15. Non-profit organization, other than those listed above
16. Other, specify ____________________

15. **What percent of your professional work time did you devote to each of the following activities during the week of FEBRUARY 11, 1979?**

%

Management & Administration of

1. __________ (41) Research and development
2. __________ (43) Educational programs
3. __________ (45) Other
4. ________ (47) Basic research
5. ________ (49) Applied research
6. ________ (51) Development of equipment, products, systems, data

%

7. ________ (53) Design
8. ________ (55) Teaching
9. ________ (57) Writing, editing
10. ________ (59) Professional services to individuals
11. ________ (61) Consulting
12. ________ (63) Production

%

13. ________ (65) Curatorial work
14. ________ (67) Performing arts
15. ________ (69) Quality control, inspection, testing
16. ________ (71) Sales, marketing, purchasing, estimating
17. ________ (73) Other, specify ________________

Total = 100%

a. **What were your primary and secondary work activities?** (Enter number 1-17 from question #15 above) ☐ Primary (75-76) ☐ Secondary (77-78)

16. **What was the basic annual salary* associated with your principal professional employment during the week of FEBRUARY 11, 1979? If you were on a postdoctoral appointment (see question #10 for definition), what was your stipend plus allowances?** $________________ per year (10-12)

Check whether salary was for ☐ 9-10 months or ☐ 11-12 months (13)

*Basic salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.

17. **What was your basic annual salary* for the year ending December 31, 1978?** $________________ per year. (14-16)

Check whether salary was for ☐ 9-10 months or ☐ 11-12 months. (17)

a. **What was your gross professional income** for the year 1978?** $________________ (18-20)

**Gross professional income is all payments received for professional activities including basic salary before deductions plus bonuses, consulting fees, honoraria, royalties, rental and subsistence allowances, etc.

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18. If you were employed by an academic institution during the week of FEBRUARY 11, 1979, did you hold a tenured position? 0 ☐ Yes 1 ☐ No (21)

If **YES**, what year was tenure granted? ________________ (22-23) If **NO**, did you hold a tenure-track position? 0 ☐ Yes 1 ☐ No (24)

19. If you were employed by an academic institution during the week of FEBRUARY 11, 1979, what was the rank of your position? ☐ Enter number from below (25)

FACULTY:

1. Professor
2. Associate professor
3. Assistant professor
4. Instructor
5. Other, specify ________________________________

NONFACULTY:

6. Teaching staff
7. Research staff
8. Other, specify ________________________________

20. Was any of your work during the week of FEBRUARY 11, 1979 supported or sponsored by U.S. Government funds?
0 ☐ Yes 1 ☐ No 2 ☐ Don't know (26)

If **YES**, which federal agencies or departments were supporting the work? ________________________________ (27-60)
(Enter the number(s) from the List of Federal Supporting Agencies on page 4)

21. Listed below are selected topics of critical national interest. If you devoted a proportion of your professional time which you considered significant to any of these problem areas during the week of FEBRUARY 11, 1979, please give the corresponding number of the ONE on which you spent the MOST time.

☐ Enter number from below (61-62)

1. Energy or fuel
2. Health
3. Defense
4. Environ. protection, pollution control
5. Education (other than teaching)
6. Space
7. Crime prevention and control
8. Food and other agricultural products
9. Natural resources, other than fuel or food
10. Community development and services
11. Housing (planning, design, construction)
12. Transportation, communications
13. Cultural life
14. Other area, specify ________________________

a. Please enter your BEST estimate of the percent of your professional time during the week of February 11, 1979 that was devoted to this area of national interest.

☐ Enter number from below (63)

1. 100 percent
2. 75 to 99 percent
3. 50 to 74 percent
4. 25 to 49 percent
5. 24 percent or less

If you selected energy or fuel (category #1) in question #21, please provide the information requested in items #22, #23 and #24.

22. From the list below, give the corresponding number of the ONE energy source that involved the LARGEST proportion of your energy-related work during the week of FEBRUARY 11, 1979. ☐ Enter number from below (64)

1. Coal and coal products
2. Petroleum (including oil shale and tar sands) or natural gas
3. Fission
4. Fusion
5. Hydroenergy
6. Direct solar (including space and water heating, thermal, electric)
7. Indirect solar (winds, tides, biomass, etc.)
8. Geothermal
9. Other, specify ________________________

23. Please read the following list of energy-related activities and give the corresponding number(s) from the list below of the activity(ies) in which you were engaged during the week of FEBRUARY 11, 1979. Enter number(s) from below ________________ (65-78)

1. Exploration
2. Extraction (gas, oil, mining)
3. Manufacture of energy-related components or products
4. Fuel processing (including refining and enriching)
5. Electric power generation
6. Transportation, transmission, distribution of fuel or energy
7. Energy storage
8. Energy utilization, management
9. Fuel reprocessing or disposal
10. Energy conservation
11. Environmental impact (health, economic, etc.)
12. Education, training
13. Research and development
14. Other, specify ________________________

24. Please enter the number 1-14 from item #23 that BEST describes the activity in which you spent MOST of your energy-related time. ☐ (79-80)

Thank you for completing this questionnaire. Please return the completed form in the enclosed envelope to the Commission on Human Resources, JH638, National Research Council, 2101 Constitution Avenue, Washington, D.C. 20418.

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DEGREE AND EMPLOYMENT SPECIALTIES LIST

MATHEMATICAL SCIENCES

000 · Algebra
010 · Analysis & Functional Analysis
020 · Geometry
030 · Logic
040 · Number Theory
052 · Probability
055 · Math. Statistics (see also 544, 670, 725, 727)
060 · Topology
082 · Operations Research (see also 478)
085 · Applied Mathematics
089 · Combinatorics & Finite Mathematics
091 · Physical Mathematics
098 · Mathematics, General
099 · Mathematics, Other*

COMPUTER SCIENCES

071 · Theory
072 · Software Systems
073 · Hardware Systems
074 · Intelligent Systems
079 · Computer Sciences, Other (see also 437, 476)

PHYSICS & ASTRONOMY

101 · Astronomy
102 · Astrophysics
110 · Atomic & Molecular Physics
120 · Electromagnetism
130 · Mechanics
132 · Acoustics
134 · Fluids
135 · Plasma Physics
136 · Optics
138 · Thermal Physics
140 · Elementary Particles
150 · Nuclear Structure
160 · Solid State
198 · Physics, General
199 · Physics, Other*

CHEMISTRY

200 · Analytical
210 · Inorganic
215 · Synthetic Inorganic & Organometallic
220 · Organic
225 · Synthetic Organic & Natural Products
230 · Nuclear
240 · Physical
245 · Quantum
250 · Theoretical
255 · Structural
260 · Agricultural & Food
265 · Thermodynamics & Material Properties
270 · Pharmaceutical
275 · Polymers
280 · Biochemistry (see also 540)
285 · Chemical Dynamics
298 · Chemistry, General
299 · Chemistry, Other*

EARTH, ENVIRONMENTAL AND MARINE SCIENCES

301 · Mineralogy, Petrology
305 · Geochemistry
310 · Stratigraphy, Sedimentation
320 · Paleontology
330 · Structural Geology
341 · Geophysics (Solid Earth)
350 · Geomorph. & Glacial Geology
391 · Applied Geol., Geol. Engr. & Econ. Geol.
395 · Fuel Tech. & Petrol. Engr. (see also 479)
360 · Hydrology & Water Resources
370 · Oceanography
397 · Marine Sciences, Other*
381 · Atmospheric Physics & Chemistry
382 · Atmospheric Dynamics
383 · Atmospheric Sciences, Other*
388 · Environmental Sciences, General (see also 480, 528)
389 · Environmental Sciences, Other*
398 · Earth Sciences, General
399 · Earth Sciences, Other*

ENGINEERING

400 · Aeronautical & Astronautical
410 · Agricultural
415 · Biomedical
420 · Civil
430 · Chemical
435 · Ceramic
437 · Computer
440 · Electrical
445 · Electronics
450 · Industrial & Manufacturing
455 · Nuclear
460 · Engineering Mechanics
465 · Engineering Physics
470 · Mechanical
475 · Metallurgy & Phys. Met. Engr.
476 · Systems Design & Systems Science (see also 072, 073, 074)
478 · Operations Research (see also 082)
479 · Fuel Technology & Petrol. Engr. (see also 395)
480 · Sanitary & Environmental
486 · Mining
497 · Materials Science Engr.
498 · Engineering, General
499 · Engineering, Other*

AGRICULTURAL SCIENCES

500 · Agronomy
501 · Agricultural Economics
502 · Animal Husbandry
503 · Food Science & Technology (see also 573)
504 · Fish & Wildlife
505 · Forestry
506 · Horticulture
507 · Soils & Soil Science
510 · Animal Science & Animal Nutrition
511 · Phytopathology
518 · Agriculture, General
519 · Agriculture, Other*

MEDICAL SCIENCES

520 · Medicine & Surgery
522 · Public Health & Epidemiology
523 · Veterinary Medicine
524 · Hospital Administration
526 · Nursing
527 · Parasitology
528 · Environmental Health
534 · Pathology
536 · Pharmacology
537 · Pharmacy
538 · Medical Sciences, General
539 · Medical Sciences, Other*

BIOLOGICAL SCIENCES

540 · Biochemistry (see also 280)
542 · Biophysics
543 · Biomathematics
544 · Biometrics and Biostatistics (see also 055, 670, 725, 727)
545 · Anatomy
546 · Cytology
547 · Embryology
548 · Immunology
550 · Botany
560 · Ecology
562 · Hydrobiology
564 · Microbiology & Bacteriology
566 · Physiology, Animal
567 · Physiology, Plant
569 · Zoology
570 · Genetics
571 · Entomology
572 · Molecular Biology
573 · Food Science & Technology (see also 503)
574 · Behavior/Ethology
576 · Nutrition & Dietetics
578 · Biological Sciences, General
579 · Biological Sciences, Other*

PSYCHOLOGY

600 · Clinical
610 · Counseling & Guidance
620 · Developmental & Gerontological
630 · Educational
635 · School Psychology
641 · Experimental
642 · Comparative
643 · Physiological
650 · Industrial & Personnel
660 · Personality
670 · Psychometrics (see also 055, 544, 725, 727)
690 · Social
698 · Psychology, General
699 · Psychology, Other*

SOCIAL SCIENCES

700 · Anthropology
703 · Archeology
708 · Communications*
709 · Linguistics
710 · Sociology
720 · Economics (see also 501)
725 · Econometrics (see also 055, 544, 670, 727)
727 · Social Statistics (see also 055, 544, 670, 725)
740 · Geography
745 · Area Studies*
751 · Political Science
752 · Public Administration
755 · International Relations
770 · Urban & Regional Planning
775 · History & Philosophy of Science
798 · Social Sciences, General
799 · Social Sciences, Other*

HUMANITIES

802 · History & Criticism of Art
804 · History, American
805 · History, European
806 · History, Other*
808 · American Studies
809 · Theater & Theater Criticism
830 · Music
831 · Speech as a Dramatic Art (see also 885)
833 · Religion (see also 881)
834 · Philosophy
836 · Comparative Literature
891 · Library & Archival Sciences
878 · Humanities, General
879 · Humanities, Other*

LANGUAGES & LITERATURE

811 · American
812 · English
821 · German
822 · Russian
823 · French
824 · Spanish & Portuguese
826 · Italian
827 · Classical*
829 · Other Languages*

EDUCATION & OTHER PROFESSIONAL FIELDS

801 · Art, Applied
881 · Theology (see also 833)
882 · Business Administration
883 · Home Economics
884 · Journalism
885 · Speech & Hearing Sciences (see also 831)
886 · Law, Jurisprudence
887 · Social Work
897 · Professional Field, Other*
899 · Other Fields*

938 · Education (other than teaching in a field listed above)

*Identify the specific field in the space on the questionnaire.

LIST OF FEDERAL SUPPORTING AGENCIES (For use with #20)

1. Agency for International Development
2. Environmental Protection Agency
3. National Aeronautics & Space Administration
4. National Endowment for the Arts
5. National Endowment for the Humanities
6. National Science Foundation
7. Nuclear Regulatory Commission
8. Smithsonian Institution
9. Department of Agriculture
10. Department of Commerce
11. Department of Defense
12. Department of Energy
13. National Institutes of Health (DHEW)
14. Alcohol, Drug Abuse & Mental Health Administration (DHEW)
15. National Institute of Education (DHEW)
16. Office of Education (DHEW)
17. Other DHEW, specify ____________
18. Department of Housing and Urban Development
19. Department of the Interior
20. Department of Justice
21. Department of Labor
22. Department of State
23. Department of Transportation
24. Other agency or department, specify ____________

25. Don't know source agency

APPENDIX B

SAMPLING FRAME

Data from the Survey of Doctorate Recipients (SDR) are collected biennally from a stratified random sample of Ph.D. scientists, engineers, and humanists. A longitudinal data base has been constructed from the four surveys conducted since 1973. For each survey, adjustments have been made to both the sampling frame and the sample. These revisions have significant implications when comparing the results of one survey to the results of another.

1973

In 1973 a sample of approximately 59,100 was randomly selected from a sampling frame (population) of 261,400 individuals who earned doctorates in science or engineering between January 1, 1930 and June 30, 1972 or who earned nonscience/nonengineering Ph.D.s in the same period but who were identified as being employed in a science or engineering position (see Appendix C, Table C.4). The sample was stratified by year of doctorate, field of doctorate or employment, sex, size of Ph.D. institution (in terms of the number of Ph.D. degrees granted), and degree category (i.e., science and engineering doctorates from U.S. institutions--segment 1; nonscience doctorates from U.S. institutions for individuals who subsequently switched to a science employment field--segment 2; and holders of doctorates from foreign institutions who were employed in the United States--segment 3).

The sampling frame for Segment 1 was the NRC's Doctorate Records File (DRF), a file which contains nearly all Ph.D.s awarded from U.S. universities between 1920 to the present. Segment 2 cases were drawn from the NSF's National Register of Scientific and Technical Personnel (1970). Segment 3 cases were selected from college catalogs, professional directories, and rosters of employees obtained from several large U.S. business/industrial firms.

1975

Individuals who earned their Ph.D. degrees in science/engineering between July 1, 1972 and June 30, 1974 were added to segment 1 of the SDR roster prior to the 1975 survey. A random, stratified sample of these Ph.D.s was added to the 1975 survey sample, and 1930-1931 Ph.D.s were deleted from the sample, leaving a sample of approximately 62,470 Ph.D.s (see Appendix C, Table C.3).

A revision in the stratification criteria resulted in the deletion of size of Ph.D. institution as a stratifying variable, and the addition of racial/ethnic classification. The source of data for the racial/ethnic variable was the Survey of Earned Doctorates (Doctorate Records File or DRF). However, because data on racial/ethnic identification was not collected until 1973, a large portion of the sample could not be classified.

1977

The cohort adjustments were again made to maintain a 42-year time span (January 1, 1934 to June 30, 1976) for scientists and engineers.

Individuals who indicated in the Survey of Earned Doctorates that they were foreign citizens and planned to depart the United States following receipt of their doctorates were deleted from the 1977 sampling frame on the assumption that there was a high probability they would remain outside the U.S. labor force.

Ph.D. recipients in the humanities field who earned their degrees between January 1, 1930 and June 30, 1974 were added to segment 1 of the sampling frame in 1977. A stratified random sample of these Ph.D.s was added to the survey sample. In view of the fact that the 1930-1933 humanities doctorates were not included as part of the 1973 and 1975 surveys, these Ph.D.s were included in the 1977 survey. Ph.D.s in the humanities were deleted from segment 2, leaving only doctorate recipients in education and other professional fields in segment 2. The 1977 survey sample was approximately 83,550 (see Appendix C, Table C.2)

1979

The 1979 sampling frame was adjusted to include only Ph.D. recipients who had earned their degrees between January 1, 1936 and June 30, 1978.

In the nonresponse bias study of the 1975 Survey of Doctorate Recipients, it was discovered that the survey nonrespondents consisted of higher percentages of foreign citizens and foreign residents. To adjust for this bias, citizenship was added as a stratification variable. The 1979 survey sample consisted of approximately 51,710 Ph.D.s (see Appendix C, Table C.1), an overall sampling rate of 11.8 percent.

Sampling Rates and Sample Attrition

For the 1973, 1975, and 1977 surveys, the sample rate averaged an overall 21 percent. In 1979, the sampling rate was reduced to an overall rate of 11.8 percent. Concurrently, the number of strata were reduced from over 2,100 to approximately 950.

A total of 90,544 individuals have been members of at least one of the four SDR samples. Of these, 29,617 or 32.7 percent have been included in all four samples: 71,676 have responded to at least one of the surveys, and 13,202 have responded to all four surveys.

Effect on Sampling Errors

Obviously, any change in the sample size has an effect on the sampling errors of population estimates. If the proportion of the population possessing a particular characteristic, $\underline{P}$, is being estimated by the statistic p, the standard error of p can be computed by $\text{S.E.}(p) = (\text{VAR}(\underline{P})/n)^{\frac{1}{2}}$, where $\text{VAR}(\underline{P})$ is estimated by $(p(1-p))$, and p equals the sample proportion and n equals the sample size.

This formula is equivalent to $\text{S.E.}(p) = [\text{S.D.}(\underline{P})]/(n)^{\frac{1}{2}}$, where $\text{S.D.}(\underline{P})$ is the standard deviation of $\underline{P}$. Holding $\text{S.D.}(\underline{P})$ fixed, the sampling error, $\text{S.E.}(p)$, will vary as n is adjusted by a factor k: $\text{S.E.}(p) = [\text{S.D.}(\underline{P})]/(kn)^{\frac{1}{2}}$ or $\text{S.E.}(p) = [\text{S.D.}(\underline{P})]/(k)^{\frac{1}{2}} \cdot (n)^{\frac{1}{2}}$. If the sample size is increased to n', $k = n'/n$. In this case the sampling error is reduced by a factor of $1/(k)^{\frac{1}{2}}$.

For example, if the sample p equals 0.2, the estimated S.D. $(\underline{P}) = (0.2\ (1-0.2))^{\frac{1}{2}} = 0.4$. If n is 100, $S.E.(p) = (0.4/(100)^{\frac{1}{2}}) = 0.04$. If n is increased to 1600, $S.E.(p) = (0.4/(1600)^{\frac{1}{2}}) = 0.01$. Here $k = 16$ and the sampling error has been reduced to $1/(k)^{\frac{1}{2}}$th its original value.

If the sample size is decreased to n', $k = n'/n<1$. In this case, the sampling error is increased by a factor of $1/(k)^{\frac{1}{2}}$. In the previous example, if the initial sample size equalled 1600, $k = (100/1600) = 1/16$. The sampling error increased from 0.01 to 0.04, a factor of $1/(1/16)^{\frac{1}{2}}$ or 4.

For the 1979 SDR the sampling frame or population is 438,078. If the previous 21 percent sampling rate had been applied, the 1979 sample would have been 91,996 The actual 1979 sample is 51,711. The expected effect on sampling errors for estimates of the total population can be approximated by computing $k = (51{,}711/91{,}996 = .562$ and $1/(k)^{\frac{1}{2}} = 1.33$. Thus for a fixed standard deviation, the sampling error should be approximately 1/3 higher under the new sampling scheme.

In these computations, the effects of the finite population correction factor have been ignored. The f.p.c. equals $(N-n)/(N-1)$ and has little effect on sampling error estimates for large populations and low sampling rates. However, although the overall sampling rate for the 1979 SDR sample is just under 12 percent, sampling rates for the 800 strata range from approximately 3 percent to 100 percent. Thus, computation of sampling errors that take into account sample stratification should result in lower sampling error estimates than computations that disregard the sample design.

Finally, this discussion applies only to the total sample n and does not address the issue of less than complete survey response, which will of course effectively reduce the sample and thus increase the sampling error. The effects of nonresponse bias are discussed in Appendix F.

APPENDIX C

RESPONSE RATES

TABLE C.1 Response Rates for the 1979 Survey of Doctorate Recipients in Science, Engineering, and the Humanities

	Sampling Frame* (N)	Sample (n)	Survey Sample+ (n)	Contacted# (n)	Survey Responses** (n)	Response Rates++ A (%)	B (%)
Total	438,078	51,711	49,671	45,994	32,877	66.2	71.5
Field of Doctorate/Employment##							
Mathematics/Computer Sci.	19,875	3,582	3,447	3,229	2,170	63.0	67.2
Physics/Astronomy	30,422	3,139	3,058	2,856	1,985	64.9	69.5
Chemistry	50,179	4,360	4,262	3,912	2,782	65.3	71.1
Environmental Sciences	11,050	2,096	2,025	1,898	1,429	70.6	75.3
Engineering	51,830	2,793	2,734	2,473	1,684	61.6	68.1
Life Sciences	89,516	15,064	14,564	13,588	9,858	67.7	72.5
Psychology	41,776	4,691	4,520	4,170	2,964	65.6	71.1
Social Sciences	55,819	4,896	4,654	4,323	2,984	64.1	69.0
Natural Sciences***	1,483	244	124	120	95	76.6	79.2
Physical Sciences***	227	221	221	192	104	47.1	54.2
Behavioral Sciences***	3,766	215	146	136	107	73.3	78.7
All S/E Fields***	2,568	349	253	235	174	68.8	74.0
History	13,627	1,141	1,088	1,023	763	70.1	74.6
Art History	1,593	666	643	603	470	73.1	77.9
Music	4,395	686	660	618	496	75.2	80.3
Speech	4,857	786	749	699	533	71.2	76.3
Philosophy	6,158	804	774	708	492	63.6	69.5
English/American Literature	21,782	1,227	1,158	1,084	786	67.9	72.5
Classical Lang./Literature	2,036	635	602	561	402	66.8	71.7
Modern Lang./Literature	12,268	2,156	2,080	1,892	1,393	67.0	73.6
Other Humanities	2,605	801	764	711	566	74.1	79.6
Languages***	453	194	190	170	103	54.2	60.6
Other Humanities***	959	494	480	434	308	64.2	71.0
All Humanities Fields***	1,804	358	354	306	200	56.5	65.4
Field Unknown	531	113	71	53	29	40.8	54.7
Year of Doctorate							
CY1936-CY1957	92,183	12,343	11,012	10,251	7,546	68.5	73.6
CY1958-FY1965	74,667	8,299	7,951	7,455	5,340	67.2	71.6
FY1966-FY1969	69,089	7,494	7,289	6,731	4,775	65.5	70.9
FY1970-FY1974	113,735	12,172	12,072	11,132	7,801	64.6	70.1
FY1975-FY1976	44,695	5,235	5,232	4,855	3,397	64.9	70.0
FY1977-FY1978	42,267	5,523	5,520	5,141	3,766	68.2	73.3
Merged Cohorts+++	747	441	410	310	201	49.0	64.8
Cohort Unknown	675	204	185	119	51	27.6	42.9
Sex							
Male	378,074	33,752	32,400	30,137	21,457	66.2	71.2
Female	60,004	17,959	17,271	15,857	11,420	66.1	72.0
Racial/Ethnic Group							
White/Unknown	423,419	47,057	45,043	41,811	30,308	67.3	72.5
Minority Group###	14,659	4,654	4,628	4,183	2,569	55.5	61.4
Citizenship							
U.S.	298,561	32,434	32,065	30,204	22,350	69.7	74.0
Foreign	39,522	5,361	5,313	4,602	2,368	44.6	51.5
Unknown	99,995	13,716	12,293	11,188	8,159	66.4	72.9
Location of Ph.D. Institution							
U.S.	426,201	49,907	47,981	44,698	32,018	66.7	71.6
Foreign	11,877	1,804	1,690	1,296	859	50.8	66.3

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* The sampling frame includes those deceased, those residing in foreign countries, and those with doctorates in education or professional fields who were working in science and engineering. Hence, these figures exceed the population estimates shown in preceding tables of this report.

+ The survey sample is the sample size minus persons known to be deceased or out-of-scope prior to the 1979 survey. The out-of-scope classification is assigned to an individual who indicated in a previous survey that he or she:
   a) holds a doctorate in education or a professional field and works in a nonscience/nonengineering position, or
   b) holds a Ph.D. degree from a foreign institution, is a foreign citizen, and resides in a foreign country.

# The number assumed contacted equals the survey sample minus those individuals for whom no valid addresses could be obtained.

** Responses include individuals found to be deceased in the 1979 survey and persons residing in foreign countries in 1979.

++ Response rate "A" is the number of 1979 survey responses divided by the number in the survey sample. Response rate "B" is the number of 1979 survey responses divided by the number assumed to have been contacted.

## Individuals who earned doctorates in science, engineering, or the humanities were stratified by field of degree. Those with doctorates in education or professional fields who were identified as working in science or engineering were stratified by field of employment.

***Merged fields created for certain small subgroups when sample was reduced.

+++Merged cohorts created for certain small subgroups when sample was reduced.

\###Includes only those individuals whose ethnic group was known at the time the sample was selected. See Table 1.3 on page 13 and Table 2.3 on page 39 for the estimated percentages of minority group members in the population.

TABLE C.2 Response Rates for the 1977 Survey of Doctorate Recipients in Science, Engineering, and the Humanities

	Sampling Frame* (N)	Sample (n)	Survey Sample+ (n)	Contacted# (n)	Survey Responses** (n)	Response Rates++ A (%)	Response Rates++ B (%)
Total	402,383	83,546	79,375	73,698	50,648	63.8	68.7
Field of Doctorate/Employment##							
Mathematics/Computer Sciences	19,384	5.141	4,776	4,472	2,873	60.2	64.2
Physics/Astronomy	28,861	6,013	5,795	5,395	3,609	62.3	66.9
Chemistry	48,260	9,148	8,786	8,213	5,736	65.3	69.8
Earth Sciences	10,004	2,197	2,095	1,954	1,457	69.5	74.6
Engineering	47,590	7,667	7,506	6,779	4,429	59.0	65.3
Life Sciences (Agricultural, Medical and Biological)	82,060	20,104	19,355	18,062	12,707	65.6	70.4
Psychology	40,601	8,390	7,772	7,375	4,994	64.3	67.7
Social Sciences	50,622	9,282	8,653	7,927	5,187	59.9	65.4
History	19,257	2,784	2,620	2,459	1,809	69.0	73.6
Art History	1,722	643	616	575	430	69.8	74.8
Music	3,910	929	890	835	621	69.8	74.4
Speech	4,913	1,038	991	926	653	65.9	70.5
Philosophy	6,214	1,186	1,131	1,030	681	60.2	66.1
Other Humanities	2,202	1,059	1,003	932	705	70.3	75.6
English/American Literature	20,891	2,859	2,730	2,548	1,830	67.0	71.8
Classics	2,282	706	661	612	448	67.8	73.2
Modern Languages	12,641	3,810	3,625	3,294	2,278	62.8	69.2
Unknown	969	590	366	310	201	54.9	64.8
Year of Doctorate							
CY1930-49	42,954	10,025	8,384	7,630	5,444	64.9	71.3
CY1950-FY1961	85,740	16,864	15,800	14,904	10,455	66.2	70.1
FY1962-69	114,461	25,496	24,317	22,649	15,407	63.4	68.0
FY1970-74	113,743	21,726	21,470	19,788	13,210	61.5	66.8
FY1975-76	44,713	9,109	9,106	8,508	6,040	66.3	71.0
Unknown	772	326	298	219	92	30.9	42.0
Ph.D. Institution							
U.S.	390,266	78,464	74,574	68,708	48,108	64.5	69.0
Foreign	12,117	5,082	4,801	3,990	2,540	52.9	63.7
Sex							
Male	351,110	64,041	60,840	56,754	38,791	63.8	68.3
Female	51,273	19,505	18,535	16,944	11,857	64.0	70.0
Race/Ethnic Group							
Minority Group***	9,176	5,177	5,145	4,700	2,743	53.1	58.4
White/Unknown	393,207	78,369	74,230	68,998	47,905	64.5	69.4

* The sampling frame includes those deceased, those residing in foreign countries, and those with doctorates in education or professional fields who were working in science or engineering.

+ The survey sample is the sample size minus persons known to be deceased or out-of-scope prior to the 1977 survey. The out-of-scope classification is assigned to an individual who indicated in a previous survey that he or she:

a) holds a doctorate in education or a professional field and works in a nonscience/nonengineering position, or

b) holds a Ph.D. degree from a foreign institution, is a foreign citizen, and resides in a foreign country.

# The number assumed contacted equals the survey sample minus those individuals for whom no valid addresses could be obtained.

** Responses include individuals found to be deceased in the 1977 survey and persons residing in foreign countries in 1977.

++ Response rate "A" is the number of 1977 survey responses divided by the number in the survey sample. Response rate "B" is the number of 1977 survey responses divided by the number assumed to have been contacted.

## Individuals who earned doctorates in science, engineering, or the humanities were stratified by field of degree. Those with doctorates in education or professional fields who were identified as working in science or engineering were stratified by field of employment.

***Includes only those individuals whose ethnic group was known at the time the sample was selected.

TABLE C.3 Response Rates for the 1975 Survey of Doctorate Recipients in Science and Engineering

	Sampling Frame* (N)	Sample (n)	Survey Sample+ (n)	Contacted# (n)	Survey Responses** (n)	Response Rates++ A (%)	Response Rates++ B (%)
Total	295,970	62,471	59,608	55,412	41,905	70.3	75.6
Field of Doctorate/Employment##							
Mathematics/Computer Sciences	17,577	4,706	4,423	4,157	3,018	68.2	72.6
Physics/Astronomy	26,771	5,527	5,343	4,984	3,694	69.1	74.1
Chemistry	45,770	8,501	8,178	7,532	5,836	71.4	77.5
Earth Sciences	9,094	2,040	1,947	1,837	1,453	74.6	79.1
Engineering	42,543	6,840	6,709	6,162	4,635	69.1	75.2
Life Sciences (Agricultural, Medical and Biological)	73,817	18,243	17,599	16,436	12,822	72.9	78.0
Psychology	35,290	7,659	7,186	6,676	4,965	69.1	74.4
Social Sciences	44,118	8,351	7,802	7,257	5,203	66.7	71.7
Unknown	990	604	421	371	279	66.3	75.2
Year of Doctorate							
CY1932-49	35,935	8,396	7,346	6,817	5,254	71.5	77.1
CY1950-FY1961	71,739	14,260	13,535	12,781	9,745	72.0	76.2
FY1962-69	95,797	22,045	21,153	19,643	14,720	69.6	74.9
FY1970-72	55,208	10,461	10,296	9,588	7,267	70.6	75.8
FY1973-74	36,519	6,983	6,977	6,343	4,796	68.7	75.6
Unknown	772	326	301	240	123	40.9	51.3
Ph.D. Institution							
U.S.	283,630	57,273	54,662	51,260	38,901	71.2	75.9
Foreign	12,340	5,198	4,946	4,152	3,004	60.7	72.4
Sex							
Male	268,041	49,869	47,615	44,372	33,589	70.5	75.7
Female	27,929	12,602	11,993	11,040	8,316	69.3	75.3
Race/Ethnic Group							
Minority Group***	3,596	1,780	1,778	1,595	1,056	59.4	66.2
White/Unknown	292,374	60,691	57,830	53,817	40,849	70.6	75.9

* The sampling frame includes those deceased, those residing in foreign countries, and those with doctorates in education or professional fields who were working in science or engineering.

+ The survey sample is the sample size minus persons known to be deceased or out-of-scope prior to the 1975 survey. The out-of-scope classification is assigned to an individual who indicated in a pervious survey that he or she:
a) holds a doctorate in education or a professional field and works in a nonscience/nonengineering position, or
b) holds a Ph.D. degree from a foreign institution, is a foreign citizen, and resides in a foreign country.

# The number assumed contacted equals the survey sample minus those individuals for whom no valid addresses could be obtained.

** Responses include individuals found to be deceased in the 1975 survey and persons residing in foreign countries in 1975.

++ Response rate "A" is the number of 1975 survey responses divided by the number in the survey sample. Response rate "B" is the number of 1975 survey responses divided by the number assumed to have been contacted.

## Individuals who earned doctorates in science and engineering were stratified by field of degree. Those with doctorates in education or professional fields who were identified as working in science or engineering were stratified by field of employment.

***Includes only those individuals whose race or ethnic group was known at the time the sample was selected.

TABLE C.4 Response Rates for the 1973 Survey of Doctorate Recipients in Science and Engineering

	Sampling Frame* (N)	Sample (n)	Survey Sample+ (n)	Contacted# (n)	Survey Responses** (n)	Response Rates++ A (%)	Response Rates++ B (%)
Total	261,393	56,096	54,987	51,813	41,024	74.6	79.2
Field of Doctorate/Employment##							
Mathematics/Computer Sciences	15,430	4,199	4,140	3,956	3,041	73.5	76.9
Physics/Astronomy	24,136	4,967	4,896	4,643	3,602	73.6	77.6
Chemistry	42,724	7,765	7,605	7,198	5,799	76.3	80.6
Earth Sciences	8,117	1,889	1,836	1,753	1,468	80.0	83.7
Engineering	36,657	5,987	5,922	5,620	4,426	74.7	78.8
Life Sciences (Agricultural, Medical and Biological)	65,306	16,333	15,979	14,822	12,051	75.4	81.3
Psychology	30,501	6,956	6,829	6,485	5,036	73.7	77.7
Social Sciences	37,581	7,402	7,187	6,784	5,149	71.6	75.9
Unknown	941	598	593	552	452	76.2	81.9
Year of Doctorate							
CY1930-49	38,851	9,112	8,324	7,581	5,983	71.9	78.9
CY1950-FY1961	71,489	14,260	14,033	13,294	10,540	75.1	79.3
FY1962-69	95,438	22,042	21,953	20,710	16,253	74.0	78.5
FY1970-72	55,103	10,356	10,351	9,954	8,078	78.0	81.2
Unknown	512	326	326	274	170	52.1	62.0
Ph.D. Institution							
U.S.	249,979	50,934	49,825	47,378	37,615	75.5	79.4
Foreign	11,414	5,162	5,162	4,435	3,409	66.0	76.9
Sex							
Male	238,438	45,260	44,430	41,972	33,338	75.0	79.4
Female	22,955	10,836	10,557	9,841	7,686	72.8	78.1

* The sampling frame includes those deceased, those residing in foreign countries, and those with doctorates in education or professional fields who were working in science or engineering.

+ The survey sample is the sample size minus persons known to be deceased prior to the 1973 survey.

# The number assumed contacted equals the survey sample minus those individuals for whom no valid addresses could be obtained.

** Responses include individuals found to be deceased in the 1973 survey and persons residing in foreign countries in 1973.

++ Response rate "A" is the number of 1973 survey responses divided by the number in the survey sample. Response rate "B" is the number of 1973 survey responses divided by the number assumed to have been contacted.

## Individuals who earned doctorates in science and engineering were stratified by field of degree. Those with doctorates in education or professional fields who were identified as working in science or engineering were stratified by field of employment.

Note: Race/ethnic group data are available from the NRC's Doctorate Record File beginning with FY 1973 Ph.D. recipients. Therefore, pre-1973 survey information on this variable was not available at the time the sample was selected.

APPENDIX D

WEIGHTING PROCEDURE

Estimates in this report are based on weighted responses. The 2,040 individuals in the total sample of 51,711 who were known to be deceased or out-of-scope prior to the survey were excluded from the survey and weighted by their sample weight. The responses received from the survey sample (32,877) were assigned a response weight that is the product of the weight for nonresponse and the sample weight. Table D.1 shows the classification of the sample and the formulas used for calculating the weights.

Each stratum with fewer than two responses was merged with a similarly defined stratum in order to calculate sampling errors. Respondents in each stratum were assigned a weight equal to the integral part of the stratum's response weight, or the integral part plus one. Allocation of weights within a stratum was made at random so as to represent the stratum population. This technique avoids the necessity of rounding fractional estimates of totals.

For example, consider a stratum which contains 60 individuals of whom 15 were selected for the sample. One of the 15 is known to be deceased prior to the survey. This individual receives a sample weight, 60/15, or 4.0, and thus represents 4 individuals in the population. The number of survey sample cases in the stratum is 14. Of these 14 individuals, 10 responded. The average weight for the respondents in this stratum would be [60/15] [14/10] = 5.6. To obtain integer weights, 4 of the respondents, chosen at random, would each receive a weight of 5, thus representing 20 individuals in the population. The 6 remaining respondents would each receive a weight of 6, thus representing 36. Combined, the 10 respondents would represent 56 individuals in the stratum, who together with the 4 individuals who are estimated to be deceased represent the entire 60 individuals in the stratum.

Table D.1 Classification of Sample and Weighting for 1979 Survey of Doctorate Recipients

Group		Number in Sample	Type of Estimation Weight[*]
TOTAL SAMPLE		51,711	
EXCLUDED FROM SURVEY			
Known Deceased Prior to 1979 Survey[**]	1,621		Sample
Out-of-Scope			
Foreigns: Out-of Scope, Based on 1973 Survey Responses[+]	58		Sample
Fields: Out-of-Scope, Based on 1973 Survey Responses[#]	274		Sample
Fields: Out-of-Scope, Based on 1975 Survey Responses[#]	87		Sample
Total		2,040	
SURVEY SAMPLE		49,671	
Unable to Mail, No Valid Address		3,677	
CONTACTED SAMPLE		45,994	
RESPONSES			
Good Responses	32,543		Response
Known Deceased as a Result of the 1979 Survey	334		Response
Total		32,877	

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[*] The sample weights (Ws) and response weights (Wr) for each stratum were computed as follows:

$Ws_h = \frac{N_h}{n_h}$, where N_h and n_h are the respective population and sample sizes of the stratum (h).

$Wr_h = \frac{N_h}{n_h} \cdot \frac{\hat{n}_h}{r_h}$, where $\hat{n}_h$ is the number of survey sample cases in the stratum and r_h is the number of survey responses in that stratum.

[**] Based on data obtained through 1973, 1975, or 1977 survey responses or through address searches.

[+] Based on responses that indicated individuals held Ph.D.'s from foreign institutions, were foreign citizens, and resided in foreign countries

[#] Based on responses that indicated individuals held doctorates in education or professional fields and were employed in nonscience/nonengineering positions.

APPENDIX E

SAMPLING ERROR

SAMPLING ERROR ESTIMATES FOR RATIOS

Most of the statistics presented in this report are ratios of two weighted sums of observations, i.e., ratios of random variables. Thus, for example, we are concerned with a ratio, $r = y/x$, where

$$y = \sum_h \left[N_h/n_h\right] \sum_i y_{hi}$$

$$x = \sum_h \left[N_h/n_h\right] \sum_i x_{hi}$$

and where y_{hi} and x_{hi} are observations made on the i^{th} response of stratum h, N_h is the number of individuals in the active population of stratum h, and n_h is the number of responses from stratum h.

The estimates of sampling error in this report are computed as if the responses obtained for a stratum are a random sample from that stratum. Strata were combined whenever the number of responses in a stratum was less than two.

The variance of the ratio y/x is estimated by the expression

$$s_r^2 = \left(\frac{y}{x}\right)^2 \left(\frac{s_y^2}{y^2} + \frac{s_x^2}{x^2} - \frac{2s_{xy}}{xy}\right)$$

where

$$s_{xy} = \sum_h \frac{N_h^2}{n_h} \frac{N_h - n_h}{N_h - 1} \frac{1}{n_h - 1} \left(\sum_i \left[x_{hi} - \bar{x}_h\right]\left[y_{hi} - \bar{y}_h\right]\right),$$

$\bar{x}_h$ and $\bar{y}_h$ being the means of the x and y values observed in stratum h, respectively. Similarly, s_x^2 and s_y^2 are defined using $\left[x_{hi} - \bar{x}_h\right]^2$ and $\left[y_{hi} - \bar{y}_h\right]^2$ in the inner summation.

Comparisons can be made between sampling errors computed on the basis of a simple random sample (srs) and those which take into account stratification. Table E.1 presents sampling errors associated with selected statistics from

TABLE E.1 Comparison of Sampling Errors for Selected Statistics

Variable Base and Subcategory	Sample Size of Variable Base	Statistic (%)	S_p (%) (srs)	S_r (%) (Stratified)
1. Science/Engineering				
Field of Ph.D.--Total Engineering Ph.D.	24,738	15.0	0.2	0.1
Field of Employment--Total Employed Employed in Mathematics	22,670	4.5	0.1	0.1
Physics/Astronomy Ph.D.--Total Employed Employed in Physics/Astronomy	1,779	60.2	1.2	1.4
Biological Science Ph.D.--Total Female	6,455	17.7	0.5	0.2
Environmental Science Ph.D.--Total Employed Part-Time	1,360	2.8	0.4	0.4
Computer Science Ph.D.--Total Full- or Part-Time Employed Employed in Business or Industry	199	44.5	3.5	5.1
Chemistry Ph.D. (FY 1973-1978 Graduates)--Total Full- or Part-Time Employed Employed in Teaching	660	15.7	1.4	1.9
1960-1969 Ph.D. Recipients (Male)--Total Academically Employed Hold Rank of Professor	2,959	54.4	0.9	1.1
Labor Force--Total Unemployed, Seeking Employment	22,981	0.9	<0.1	0.1
Labor Force--Total Social Science Ph.D. Employed Full-Time	2,555	94.4	0.5	0.5
Labor Force--Total Male Unemployed, Seeking Employment	16,045	0.7	<0.1	0.1
Labor Force--Medical Science Ph.D./Female Employed Full-Time	360	81.6	2.0	1.9
2. Humanities				
Field of Ph.D.--Total History Ph.D.	6,057	25.7	0.6	0.3
Field of Employment--Total Employed Employed in Music	5,256	5.9	0.3	0.1
History Ph.D.--Total Employed Employed in Other Humanities	716	3.6	0.7	0.8
Philosophy Ph.D.--Total Female	506	13.5	1.5	0.3
Modern Language Ph.D.--Total Employed Full-Time	1,557	79.0	1.0	1.1
Art History Ph.D.--Total Full- or Part-Time Employed Employed in 4-Year College/University	371	82.9	2.0	1.8
Speech/Theater Ph.D. (FY 1973-1978 Graduates)--Total Full- or Part-Time Employed Employed in Management/Administration	163	7.6	2.1	2.3
1960-1969 Ph.D. Recipients (Male)--Total Academically Employed Hold Rank of Professor	791	54.9	1.8	2.2
Labor Force--Total Unemployed, Seeking Employment	5,430	2.2	0.2	0.2
Labor Force--Total Music Ph.D. Employed Full-Time	500	87.4	1.5	1.6
Labor Force--Classical Languages and Literature Ph.D., Male Employed Full-Time	188	91.6	2.0	2.0
Labor Force--Total Female Unemployed, Seeking Employment	2,521	4.6	0.4	0.6

the report. Bases of various sample sizes and a range of statistic values have been chosen to provide representative comparisons. Sampling errors in the column s_p were computed with the expression $\left(\frac{p[1-p]}{n}\right)^{\frac{1}{2}}$, while those under s_r were calculated with the formula described above, which takes into account the sample design. The statistics are in percentage form and are the estimated proportion of a variable category with a given characteristic, $\frac{1}{n}\sum_{i}^{n} y_i$ (for the purposes of s_p), or the ratio of two random variables, $\frac{y}{x}$ (for the purposes of s_r). Whenever possible, the subgroups examined are the same as those in the 1977 Profile report in order to facilitate comparisons of the effects on sampling errors of sample size reductions.

For the most part, differences between the two error estimates are small. Calculations based on an srs are for most statistics the same as or slightly higher than those which take account of the stratification. For statistics which are ratios of two stratifying variables (e.g., the ratio of women philosophy Ph.D.s to total philosophy Ph.D.s), the estimate of sampling error is much higher using the formula for s_p. In certain cases (mainly those involving estimates of type of employer or primary work activity for small subgroups), the use of the formula for an srs appears to underestimate the sampling error.

Taking these potential discrepancies into account, a useful approximation of the sampling errors of those statistics presented in this report in percentage form can be obtained from Table E.2. This table summarizes sampling errors associated with various proportion values at given sample sizes. Calculations in the table assume a simple random sample.

Values for Table E.2 were computed using the formula $s_p = \left(\frac{p[1-p]}{n}\right)^{\frac{1}{2}}$, in which p is the proportion of a particular category (variable) possessing a certain characteristic, y $\left(\text{i.e., } p = \frac{1}{n}\sum_{i}^{n} y_i\right)$, and n is the number of sample cases in the variable-specified category (e.g., doctoral scientists and engineers in the U.S. labor force). The finite population correction factor, $fpc = \left([N-n] / [N-1]\right)^{\frac{1}{2}}$, has been omitted from the calculations, since the fpc has negligible effect on most statistics in this report, unless the estimate applies to a subgroup that has a high sampling rate. In any case, the omission of the fpc in the formula for s_p yields a conservative estimate (i.e., a higher estimate) of the sampling error.

TABLE E.2 Approximate Sampling Errors for Various Statistics and Sample Sizes

Sample Size	Proportion				
	0.01 or 0.99	0.05 or 0.95	0.10 or 0.90	0.25 or 0.75	0.50
37,500	0.00051	0.00113	0.00155	0.00224	0.00258
12,100	0.00090	0.00198	0.00273	0.00394	0.00455
10,300	0.00098	0.00215	0.00296	0.00427	0.00493
9,000	0.00105	0.00230	0.00316	0.00456	0.00527
4,300	0.00152	0.00332	0.00457	0.00660	0.00762
2,400	0.00203	0.00445	0.00612	0.00884	0.01021
1,200	0.00287	0.00629	0.00866	0.01250	0.01443
800	0.00352	0.00771	0.01061	0.01531	0.01768
400	0.00497	0.01090	0.01500	0.02165	0.02500
200	0.00704	0.01541	0.02121	0.03062	0.03536
100	0.00995	0.02179	0.03000	0.04330	0.05000

The estimated populations for particular variables are provided in this report. The sample sizes can be estimated by multiplying the population by the weighting fraction, which is the sampling fraction corrected for non-response. The mean weighting fractions for selected groups are presented in Table E.3.

Example: In Table 1.4A, the population of environmental science Ph.D.s is 10,400. Multiplying by 0.131, the approximate sample size is 1,362. The sampling error of a reported statistic (for instance, employed full-time, 90.8 percent) can be estimated using the formula for s_p or consulting Table E.2 using rough approximations of the sample size and percentage in proportion form. In this case, $s_p = \left(\frac{0.908 \quad [1-0.908]}{1,362}\right)^{\frac{1}{2}} = 0.00783$, or

0.8 percent. Similarly, the value in the table opposite 1,200 for 0.90 is 0.00866. The reader can construct the desired confidence interval by by multiplying the standard error by the appropriate coefficient: $\pm 1 s_p$ will provide a 66.7 percent confidence interval, $\pm 2\ s_p$ approximately a 95 percent interval, etc.

Table E.3 Mean Weighting Fractions for Selected Groups

	Science/ Engineering	Humanities	
TOTAL IN U.S.	0.076	TOTAL IN U.S.	0.085
Men	0.059	Men	0.060
Women	0.213	Women	0.159
Minority	0.097	Minority	0.193
Mathematics	.110	History	.045
Computer Science	.113	Art History	.251
Physics/Astronomy	.069	Music	.127
Chemistry	.058	Speech/Theater	.123
Environmental Sci.	.131	Philosophy	.087
Engineering	.034	Other Humanities	.214
Agricultural Sci.	.095	English/American Lang. and Lit.	040
Medical Sci.	.170		
Biological Sci.	.110	Classical Lang. and Lit.	.210
Psychology	.072	Modern Lang. and Lit.	.121
Social Science	.056		

SAMPLING ERROR ESTIMATES FOR MEDIANS*

Sampling errors for median salary estimates presented in this report were computed not by strata but for all observations n, the number of sample cases in a particular subgroup reporting a salary. Comparisons of sampling errors for ratios and proportions (see above) indicate only minor differences between those calculated by strata and those that do not fully take into account sample design. The reader should interpret the confidence intervals as close approximations.

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* The method for determining sampling errors of medians in this report was adapted from Morris H. Hansen, William N. Hurwitz, and William G. Madow, Sample Survey Methods and Theory, vol. 1 (John Wiley & Sons, Inc., New York, 1953), pp. 448-449.

From the estimated population distribution, a statistic, m, is computed that is an estimator of M, the position measure. When m is a median (p_m), the proportion of cases in the derived distribution falling below the position measure equals 0.5. The sampling error of p_m is estimated by the formula $s_{p_m} = \left(\frac{p_m[1-p_m]}{n}\right)^{\frac{1}{2}}$. Two additional proportions are then computed:

$$p_1 = p_m - ks_{p_m}$$

$$p_2 = p_m + ks_{p_m}$$

The confidence interval for the median is set by calculating m_1 and m_2, the values below which p_1 and p_2 of the population distribution fall. The level of confidence is determined by k and will be 66.7 percent when k = 1, approximately 95 percent when k = 2, etc. Because the values of m_1 and m_2 depend on the variability of the distribution, the reader is cautioned that corresponding values for 2 standard errors are not necessarily twice those for 1 standard error. Confidence intervals in the text were calculated for 1 standard error.

Example: In Table 1.7 an estimated median annual salary of $26,600 is reported for Ph.D. psychologists. This was computed on the basis of 2,178 sample observations. Therefore, $s_{p_m} = \left(\frac{0.5[1-0.5]}{2,178}\right)^{\frac{1}{2}} = 0.0107$. To construct a 95 percent confidence interval, compute $p_1 = 0.5 - 2[0.0107] = 0.4786$ and $p_2 = 0.5 + 2[0.0107] = 0.5214$, which round to 0.48 and 0.52. The values m_1 = $26,200 and m_2 = $27,000 are then calculated and provide the bounds of this interval. Table E.4 contains the 95 percent confidence intervals of median salary estimates for selected categories.

Table E.4 95 Percent Confidence Intervals of Median Salaries for Selected Categories (In Thousands of Dollars)

	Science/Engineering	Humanities
Total, Full-Time Employed Ph.D.s	28.9 - 29.5	22.6 - 23.1
Men	29.7 - 30.1	23.4 - 24.2
Women	23.0 - 23.3	19.5 - 20.1
Employed in Educ. Instit.	26.2 - 26.6	22.9 - 23.4
Employed in Bus./Ind.	33.4 - 34.3	17.1 - 20.5
Employed in Federal Govt., Civ.	32.8 - 34.1	20.4 - 23.8*
Employed in Federal Govt., Military	26.7 - 29.6	
Employed in State/Local Govt.	22.8 - 24.9	

Mathematics	25.7 - 26.8	History	23.3 - 24.6
Computer Sciences	27.9 - 29.7	Art History	20.8 - 23.2
Physics/Astronomy	30.1 - 30.9	Music	21.7 - 23.5
Chemistry	30.5 - 31.4	Speech/Theater	24.5 - 26.7
Environmental Sciences	28.6 - 30.2	Philosophy	21.4 - 24.1
Engineering	32.0 - 33.2	Other Humanities	22.6 - 24.7
Agricultural Sciences	27.6 - 28.8	English/Amer. Lang. & Lit.	21.8 - 22.8
Medical Sciences	30.5 - 32.0	Classical Lang. & Lit.	20.2 - 22.2
Biological Sciences	26.8 - 27.5	Modern Lang. & Lit.	21.6 - 22.6
Psychology	26.2 - 27.0		
Social Sciences	26.2 - 27.1		

*Employed in Federal Government (Civilian or Military) or State/Local Government.

APPENDIX F

NONRESPONSE BIAS

METHODOLOGY

Variations of population estimates attributable to chance were discussed in Appendix E, Sampling Error. Estimates may also be biased due to various nonsampling errors, including incomplete coverage of the population. Of the 49,671 individuals in the 1979 SDR survey sample, 32,877 or 66.2 percent responded to the 1979 survey. Differences between the respondents and non-respondents could bias the population estimate.

The 1979 nonrespondents were classified into three groups: 1) those who declined to participate in the survey (N = 298); 2) those who were not mailed questionnaires because no valid addresses could be obtained for them (N = 3,677); and 3) those who were presumably contacted but did not return their questionnaire (N = 12,819). To determine whether or not bias exists as a result of nonresponse, one would ideally survey a random sample of nonrespondents and compare their characteristics with those characteristics of the respondents. Such comparisons could possibly reveal important differences between the two groups, and thus alert users of the data to inaccuracies in the data. Nonresponse bias in the 1975 SDR was investigated in just this manner.*

Because the resources of both time and funds required to conduct a nonresponse bias survey are great, a different approach has been adopted for this report. Both demographic and employment characteristics are analyzed in the following text to determine whether any bias exists. The Commission on Human Resources' Survey of Earned Doctorates, an annual survey of the new Ph.D. recipients form U.S. universities, contains information on sex, year of Ph.D., and field of Ph.D. for the entire SDR sample. Data on age and citizenship are available for most of the FY1958-FY1978 Ph.D. recipients.

Employment status information is not available for the 1979 nonrespondent. The reliability of the response data can be evaluated, however, by comparing the characteristics of early respondents to the late respondents.+ For this analyses, the respondents to the initial mailings of May and July 1979 are compared with respondents to the follow-up mailings of September, October, and December. This latter group is a surrogate for the nonrespondents to the survey.

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*Spisak, Andrew W. and Maxfield, Betty D., The Effects of Nonresponse Bias on the 1975 Survey of Doctoral Scientists and Engineers, Washington, D.C.: National Academy of Sciences, 1979.

+For an example of this approach, see Commission on Human Resources, An Evaluation of the 1973 Survey of Doctoral Scientists and Engineers, Washington, D.C.: National Academy of Sciences, 1976

DEMOGRAPHICS CHARACTERISTICS

Sex

Differences between the respondents and nonrespondents were small for the variable, sex, and not subject to nonresponse bias.

Table F.1 Science/Engineering and Humanities Ph.D.s by Response Status and Sex

	Total (N)	Male %	Female %
Science/Engineering	340,760	88.8	11.2
Respondents	226,470	88.6	11.4
Nonrespondents	114,290	89.2	10.8
Humanities	75,090	74.6	25.4
Respondents	51,680	74.0	26.0
Nonrespondents	23,410	75.8	24.2

Year of Ph.D.

For both the science/engineering Ph.D.s and humanities doctorates differences between respondents and nonrespondents by calendar year of Ph.D. groupings are small and not subject to nonresponse bias. The largest difference, which was still too small to cause any concern, occurs in the 1970-1973 S/E group, where there were 23.5 percent for nonrespondents compared with 20.9 percent for the respondents.

Table F.2 Calendar Year of Doctorate of Science/Engineering and Humanities Ph.D.s by Response Status

	Total (N)	1936-1949 %	1950-59 %	1960-69 %	1970-73 %	1974-76 %	1977-78 %
S/E Total	340,760	7.4	15.6	31.8	21.8	15.6	7.8
Respondents	226,470	7.8	16.1	31.7	20.9	15.3	8.0
Nonrespondents	114,290	6.5	14.5	32.1	23.5	16.1	7.2
Humanities Total	75,090	7.5	13.9	28.6	24.0	17.9	8.2
Respondents	51,680	7.1	14.2	28.7	23.6	17.8	8.6
Nonrespondents	23,410	8.2	13.3	28.3	24.8	18.1	7.3

Table F.3 Field of Doctorate of Science/Engineering and Humanities Ph.D.s by Response Status

S/E Field of Doctorate	Total Survey Sample (N)	Respondents %	Nonrespondents %
All Fields	340,760	226,470	114,290
Mathematics	5.3	5.0	5.8
Computer Sciences	0.6	0.6	0.5
Physics/Astronomy	8.7	8.5	9.0
Chemistry	14.1	14.5	13.4
Environmental Sciences	3.3	3.5	2.8
Engineering	15.0	14.2	16.5
Agricultural Sciences	4.6	4.6	4.6
Medical Sciences	2.8	2.8	2.8
Biological Sciences	18.1	18.8	16.7
Psychology	12.0	12.3	11.5
Social Sciences	15.6	15.2	16.5
Humanities Field of Doctorate			
All Fields	75,090	51,680	23,410
History	25.9	26.0	25.6
Art History	2.5	2.6	2.1
Music	6.0	6.6	4.7
Speech/Theater	5.9	5.8	6.0
Philosophy	8.4	7.6	10.1
Other Humanities	3.1	3.3	2.7
English/American Lang. & Lit.	27.7	28.0	26.9
Classical Languages & Lit.	2.7	2.5	3.0
Modern Languages & Literature	17.9	17.6	18.8

Field of Ph.D.

Although the differences are not significant, a higher percentage of engineers fell in the nonresponse category and a higher percentage of biological scientists were in the response category. However, in general, differences between nonrespondents and respondents in all the S/E Ph.D. fields were small and not of concern.

Age and Citizenship

Data on age and citizenship are available for FY1958-FY1978 Ph.D. recipients only or 78 percent of the science/engineering and humanities sample. The median ages of science/engineering respondents and nonrespondents are essentially the same. Similarly, the median age of humanists who responded to the 1979 survey differs little from the median age of nonrespondents.

Table F.4 Median Age of Science/Engineering and Humanities Ph.D.s by Response Status

	S/E	Humanities
Total Sample	39.1	41.7
Respondents	39.1	41.6
Nonrespondents	39.2	42.0

Of the five demographic variables for which respondents and nonrespondents were compared the most noteworthy differences were found for citizenship. While 92.7 percent of the science/engineering respondents were U.S. citizens, only 73.8 percent of the nonrespondents were U.S. citizens (Table F.5). The differences between respondents and nonrespondents were not so great for humanities Ph.D.s where 95.9 percent of the respondents were U.S. citizens compared with 89.2 percent of the nonrespondents.

Table F.5 Citizenship of Science/Engineering and Humanities Ph.D.s by Response Status

	Total Population	U.S.	Foreign	No Report
Science/Engineering Total	274,850	86.3	12.7	0.1
Respondents	181,080	92.7	7.1	0.1
Nonrespondents	93,770	73.8	23.3	2.9
Humanities, Total	61,570	93.8	4.9	1.3
Respondents	42,400	95.9	3.7	0.4
Nonrespondents	19,170	89.2	7.6	3.2

EMPLOYMENT CHARACTERISTICS

Employment Status

For scientists and engineers differences in employment status for early respondents and late respondents are small. In fact, the same proportion of early and late respondents indicated that they were unemployed and seeking employment. (Table F.6A)

Table F.6A Employment Status of Science and Engineering Ph.D.s by Response Wave

1979 Employment Status	Total Response	Early Response	Late Response
Total Population	324,340	241,750	82,590
Employed Full-Time	88.0	88.3	87.2
Employed Part-Time	3.2	3.1	3.5
Postdoctoral Appointment	3.1	3.1	3.3
Not Employed	5.2	5.1	5.4
Seeking Employment	0.9	0.9	0.9
Not Seeking Employment	1.1	1.0	1.4
Retired	3.2	3.2	3.2
Other	0.3	0.3	0.2
No Report	0.3	0.2	0.4

The early responding humanities Ph.D.s tended to be employed full-time in slightly larger proportions than the late respondents (Table F.6B). Conversely, a slightly higher percentage of the late respondents were in the not employed categories. The differences, however, were not large enough to result in a biasing effect on the data.

Table F.6B Employment Status of Humanities Ph.D. by Response Wave

1979 Employment Status	Total Resp.	Early Resp.	Late Resp.
Total Population	71,170	47,440	23,730
Employed Full-Time	81.6	83.1	78.5
Employed Part-Time	6.8	6.2	7.9
Postdoctoral Appointment	0.7	0.7	0.5
Not Employed	10.3	9.3	12.2
Seeking Employment	2.0	1.9	2.1
Not Seeking Employment	2.2	1.9	2.8
Retired	6.1	5.5	7.3
Other	0.3	0.2	0.3
No Report	0.4	0.4	0.5

Field of Employment

There were few important differences between S/E respondents and nonrespondents by employment fields. By comparison, a somewhat higher percentage of early respondents reported that they were employed in chemistry (11.4 percent) compared with the late respondents (9.6 percent)(Table F.7A).

Table F.7A Field of Employer of Science and Engineering Ph.D.s by Response Wave

1979 Field of Employment	Total Resp.	Early Resp.	Late Resp.
Total Employed	305,890	228,290	77,600
Mathematics	4.5	4.4	4.6
Computer Sciences	2.1	2.1	1.9
Physics/Astronomy	6.0	6.2	5.4
Chemistry	10.9	11.4	9.6
Environmental Sciences	4.6	4.7	4.4
Engineering	15.3	15.1	15.9
Agricultural Sciences	4.6	4.7	4.4
Medical Sciences	6.1	6.2	5.8
Biological Sciences	14.7	14.9	14.3
Psychology	10.6	10.4	11.4
Social Sciences	11.8	11.6	12.6
Nonscience/Nonengineering	5.9	5.9	6.0
No Report	2.8	2.5	3.7

A small but larger percentage of humanities doctorates who responded early were employed in history and English, while later respondents were employed in slightly larger proportions in philosophy and modern languages (Table F.7B). Again, it should be noted that none of these differences were significant.

Table F.7B Field of Employer of Humanities Ph.D.s by Response Wave

1979 Field of Employment	Total Resp.	Early Resp.	Late Resp.
Total Employed	63,370	42,730	20,640
History	18.0	19.3	15.4
Art History	2.3	2.2	2.6
Music	5.8	5.9	5.6
Speech/Theater	2.8	2.7	3.0
Philosophy	5.9	5.3	7.0
Other Humanities	4.6	4.3	5.2
English/American Lang. & Lit.	21.6	22.8	18.9
Classical Languages & Lit.	1.6	1.7	1.6
Modern Languages & Literature	14.1	13.3	15.9
Nonhumanities	18.6	18.3	19.2
No Report	4.7	4.2	5.6

Type of Employer

Differences between the S/E respondents and nonrespondents are very small and do not indicate any bias (Table F.8A). Among humanists a slightly higher percentage of the early respondents than the late respondents were employed by four-year colleges, universities or medical schools (Table F.8B). Conversely, a slightly higher percentage of the late respondents reported employment in business/industry compared with the early respondents.

Table F.8A Type of Employer of Science and Engineering Ph.D.s by Response Wave

1979 Type of Employer	Total Resp.	Early Resp.	Late Resp.
Employed Population*	295,730	220,870	74,860
Educational Institution	54.3	54.4	54.1
4-Year College/Univ/Med Sch.	52.2	52.4	51.7
2-Year College	1.4	1.3	1.6
Elem/Secondary School	0.7	0.7	0.7
Business/Industry+	27.6	27.5	27.6
U.S. Government	8.6	8.7	8.2
State/Local Government	1.9	2.0	1.6
Hospital/Clinic	3.0	3.0	3.1
Other Non-Profit Organization	3.3	3.2	3.5
Other	0.9	0.9	1.0
No Report	0.5	0.3	0.9

* Excludes postdoctoral appointees
\+ Includes self-employed

Table F.8B Type of Employer of Humanities Ph.D.s by Response Wave

1979 Type of Employer	Total Resp.	Early Resp.	Late Resp.
Employed Population*	62,900	42,390	20,510
Educational Institution	86.6	87.7	84.2
4-Year College/Univ/Med Sch.	79.6	80.7	77.4
2-Year College	4.4	4.6	4.0
Elem/Secondary School	2.5	2.4	2.8
Business/Industry+	5.6	4.9	6.8
Government	2.6	2.2	3.2
Non-Profit Organization	3.4	3.4	3.4
Museum/Historical Society	0.5	0.5	0.6
Research Library/Archives	0.3	0.2	0.6
Other	0.2	0.2	0.1
No Report	0.9	0.9	1.0

* Excludes postdoctoral appointees
\+ Includes self-employed

Primary Work Activity

While 31.1 percent of the early S/E respondents were engaged in research and development, 29.1 percent of the late respondents were similarly employed, a small difference (Table F.9A).

Table F.9A Primary Work Activity of Science and Engineering Ph.D.s By Response Wave

1979 Primary Work Activity	Total Resp.	Early Resp.	Late Resp.
Employed Population*	295,730	220,870	74,860
Teaching	29.9	29.7	30.4
Research/Development/Design	30.6	31.1	29.1
Management/Administration	23.8	23.9	23.4
of Research and Development	14.3	14.4	14.1
of Educational Programs	5.7	5.8	5.2
of Other Activities	3.8	3.7	4.1
Consulting/Professional Serv.	8.4	8.2	9.1
Writing/Editing	1.7	1.7	1.8
Marketing/Production/Inspection	2.3	2.4	2.0
Other	1.9	2.0	1.8
No Report	1.3	1.0	2.3

*Excludes postdoctoral appointees

Higher percentages of early respondents holding humanities Ph.D.s cited teaching and research as their primary work activities (Table F.9B). Late respondents were more likely to be engaged in writing and editing.

Table F.9B Primary Work Activity of Humanities Ph.D.s by Response Wave

1979 Primary Work Activity	Total Resp.	Early Resp.	Late Resp.
Employed Population*	62,900	42,390	20,510
Teaching	65.1	66.7	61.8
Research	4.7	5.4	3.5
Consulting/Professional Serv.	2.6	2.4	2.9
Management/Administration	13.2	13.1	13.3
Writing/Editing	5.4	4.7	6.9
Curatorial	0.7	0.5	0.9
Performing Arts	1.1	1.0	1.3
Other	3.6	3.6	3.6
No Report	3.7	2.7	5.8

* Excludes postdoctoral appointees.

Annual Salary

Science/engineering Ph.D.s who responded early had a somewhat higher median annual salary than late respondents, $29,400 compared with $28,700

(Table F.10). Early and late humanities respondents earned substantially the same salaries, $22,900 and $22,800, respectively.

Table F.10 Median Annual Salary of Science/Engineering and Humanities Ph.D.s by Response Wave (In Thousands of Dollars)

	Total Resp.	Early Resp.	Late Resp.
Science/Engineering	$29.2	$29.4	$28.7
Humanities	$22.9	$22.9	$22.8

CONCLUSIONS

Nonresponse bias does not appear to be a problem when estimating demographic characteristics of the science/engineering and humanities Ph.D. population. Because nonresponse is taken into consideration when weights are assigned (Appendix D) and because four of the five variables analyzed are stratifying variables, biases associated with these demographic variables are corrected.

APPENDIX G

FINE FIELDS OF EMPLOYMENT

FINE FIELDS OF EMPLOYMENT OF DOCTORAL SCIENTISTS AND ENGINEERS IN THE UNITED STATES, 1979

1979 Fine Field of Employment	Est. N
Total Population	324,335
Mathematics Total	13,661
Algebra	1,310
Analysis & Functional Anal.	1,734
Geometry	374
Logic	177
Number Theory	297
Probability	349
Math Statistics	2,195
Topology	819
Operations Research[1]	951
Applied Mathematics	1,791
Combinatorics & Finite Math	366
Physical Mathematics	151
Mthematics, General	2,662
Mathematics, Other	485
Computer Sciences Total	6,392
Theory	462
Software Systems	4,038
Hardware Systems	527
Intelligent Systems	432
Computer Sciences, Other	933
Physics & Astronomy Total	18,287
Astronomy	714
Astrophysics	1,302
Atomic & Molecular	1,291
Electromagnetism	423
Mechanics	45
Acoustics	629
Fluids	387
Plasma Physics	1,476
Optics	1,346
Thermal Physics	243
Elementary Particles	1,595
Nuclear Structure	771
Solid State	2,977
Physics, General	2,985
Physics, Other	2,103
Chemistry Total	35,923
Analytical Chemistry	4,373
Inorganic Chemistry	1,913
Synth. Inorg & Organomet.	516
Organic Chemistry	6,676
Synth Organ & Nat. Prod.	2,256
Nuclear Chemistry	452
Physical Chemistry	3,660
Quantum Chemistry	213
Theoretical Chemistry	255
Structural Chemistry	300
Agricultural & Food	717
Thermodyn. & Mater'l Prop.	407
Pharmaceutical Chemistry	1,396
Polymers	4,958
Biochemistry	2,555
Chemical Dynamics	264
Chemistry, General	2,160
Chemistry, Other	2,852
Earth, Environmental & Marine Sciences Total	14,020
Mineralogy, Petrology	772
Geochemistry	779
Stratigraphy, Sedimen.	680
Paleontology	549
Structural Geology	302
Geophysics (Solid Earth)	1,294
Geomorph., Glacial Geol.	255
Hydrology	929
Oceanography	1,002
Atmospheric Chem. & Phys.	965
Atmospheric Dynamics	259
Atmospheric Sci., Other	559
Environmental Sci., Gen.	1,623
Environmental Sci. Other	807
Applied Geology, Etc.	1,702
Fuel Tech & Petrol Engr.	214
Marine Sciences, Other	624
Earth Sciences, General	63[illegible]
Earth Sciences, Other	56[illegible]
Engineering Total	45,884
Aero- & Astronautical	2,141
Agricultural	822
Biomedical	1,139
Civil	3,284
Chemical	5,681
Ceramic	696
Computer	705
Electrical	4,066
Electronics	3,205
Industrial/Manufacturing	1,086
Nuclear	2,153
Engineering Mechanics	1,203
Engineering Physics	1,187
Mechanical	4,929
Metallurgy & Phys. Met.	2,305
Systems Design & Sys Sci.	3,448
Operations Research[4]	1,342
Fuel Tech. & Petrol Engr.[5]	982
Sanitary/Environmental	1,362
Mining	155
Materials Sci. Engr.	2,438
Engineering, General	722
Engineering, Other	1,833
Agricultural Sciences Total	14,186
Agronomy	1,695
Agricultural Economics	2,189
Animal Husbandry	553
Food Science & Tech.	1,194
Fish & Wildlife	745
Forestry	1,238
Horticulture	1,233
Soils & Soil Science	1,055
Animal Sciences	1,380
Phytopathology	1,274
Agricultural Sci., General	373
Agricultural Sci., Other	1,254
Medical Sciences Total	18,567
Medicine & Surgery	2,766
Public Health	1,643
Veterinary Medicine	986
Hospital Administration	200
Nursing	592
Parasitology	413
Environmental Health	692
Pathology	1,418
Pharmacology	2,989
Pharmacy	1,051
Medical Sciences, General	997
Medical Sciences, Other	4,820
Biological Sciences Total	42,557
Biochemistry	6,631
Biophysics	1,365
Biomathematics	55
Biometrics, Biostatis	1,275
Anatomy	2,008
Cytology	791
Embryology	430

FINE FIELDS OF EMPLOYMENT OF DOCTORAL SCIENTISTS AND ENGINEERS IN THE UNITED STATES, 1979

1979 Fine Field of Employment	Est. N
Immunology	1,807
Botany	1,748
Ecology	2,273
Hydrobiology	226
Microgiol. & Bacteriol.	4,574
Physiology (Animal)	4,064
Physiology (Plant)	1,018
Zoology	1,679
Genetics	2,119
Entomology	2,110
Molecular Biology	2,546
Food Science & Technology	364
Behavior/Ethology	549
Nutrition & Dietetics	802
Biological Sciences, General	2,213
Biological Sciences, Other	1,910
Psychology Total	32,545
Clinical Psychology	16,099
Counceling & Guidance	1,214
Developmental & Gerontol.	1,682
Educational Psychology	775
School Psychology	897
Experimental Psychology	2,994
Comparative Psychology	261
Physiological Psychol.	1,139
Industrial & Personnel	1,573
Personality Psychology	313
Psychometrics	363
Social Psychology	1,650
Psychology, General	1,114
Psychology, Other	2,471
Social Sciences Total	36,215
Anthropology	2,336
Archeology	776
Communications	1,579
Linguistics	893
Sociology	6,207
Economics	8,943
Econometrics	424
Social Statistics	518
Geography	1,994
Area Studies	208
Political Science	6,701
Public Administration	1,983
International Relations	788
Urban & Regional Planning	658
History & Phil. of Sci.	268
Social Sciences, General	368
Social Sciences, Other	1,571
Arts & Humanities Total	1,295
History & Crit. of Art	113
American History	158
European History	43
History, Other	154
American Studies	122
Theater & Theater Crit.	39
Music	50
Speech As A Dramatic Art	130
Philosophy	74
Comparative Literature	3
Humanities, General	13
Humanities, Other	146
Library & Archival Sci.	250
Languages & Literature Total	524
American	11
English	150
German	4
Russian	100
French	23
Spanish & Portuguese	117
Classical	23
Other Languages	96
Education and Other Prof. Fields Total	16,246
Education	4,724
Applied Art	48
Religion	416
Theology	123
Business Administration	3,929
Home Economics	136
Journalism	347
Speech & Hearing Science	247
Law, Jurisprudence	722
Social Work	303
Professional Field, Other	1,030
Other Fields	4,221
No Report	8,589
Not Employed	18,444

FINE FIELDS OF EMPLOYMENT OF PH.D.'S IN THE HUMANITIES AND SELECTED SOCIAL SCIENCES IN THE UNITED STATES, 1979

1979 Fine Field of Employment	Est. N
Total Population	71,174
Mathematics Total	80
Computer Sciences Total	189
Physical Sciences Total	64
Engineering Total	135
Agricultural Sciences Total	66
Medical and Biological Sciences Total	199
Psychology Total	238
Clinical	33
Counseling and Guidance	139
Psychology, Other	66
Social Sciences Total	3,278
Anthropology	42
Archeology	42
Communications	1,008
Linguistics	237
Sociology	68
Social Statistics	65
Geography	34
Area Studies	209
Political Science	242
Public Administration	305
International Relations	43
Urban & Regional Planning	134
History & Phil of Science	123
Social Sciences, General	308
Social Sciences, Other	419
Arts and Humanities Total	25,585
History & Criticism of Art	1,475
History, American	5,168
History, European	3,142
History, Other	2,638
American Studies	484
Theater & Theater Criticism	1,319
Music	3,674
Speech as a Dramatic Art	449
Philosophy	3,717
Comparative Literature	622
Humanities, General	936
Humanities, Other	580
Library and Archival Sciences	1,381
Education and Other Professional Fields Total	7,527
Education	2,780
Art, Applied	71
Religion	846
Theology	283
Business Administration	536
Journalism	423
Speech & Hearing Science	433
Law, Jursiprudence	170
Social Work	109
Professional Field, Other	308
Other fields	1,568
No Report	2,957
Not Employed	7,809

APPENDIX H

ADJUSTMENTS TO 1979 DOCTORAL LABOR FORCE ESTIMATES

Throughout this report population estimates cited for doctoral scientists, engineers, and humanists residng in the United States in February 1979, include doctoral recipients who earned their degrees from January 1, 1936 through June 30, 1978. A more precise estimate of the February 1979 doctoral labor force would also include those Ph.D.s earned between July 1, 1978 through January 31, 1979. Selected demographic characteristics of these most recent Ph.D.s in science/engineering and the humanities are presented in Tables H.1 and H.2.

Table H.1 Demographic Characteristics by Field of Science/Engineering (July 1, 1978 to January 31, 1979 graduates)

	Field of Doctorate											
	All Fields	Math	Comp Sci	Phys/ Astrn	Chem	Envir Sci	Engr	Agri Sci	Med Sci	Bio Sci	Psych	Soc Sci
Total Population	9070	344	118	537	804	307	1124	423	347	1637	1658	1771
Sex												
Male	7062	287	106	508	696	279	1095	374	249	1206	993	1269
Female	2008	57	12	29	108	28	29	49	98	431	665	502
Race/Ethnic Group												
White/Caucasian	6869	252	90	376	584	261	665	319	269	1321	1366	1366
Minority Group+	1401	67	20	98	159	30	371	70	51	182	110	243
No Report	800	25	8	63	61	16	88	34	27	134	182	162
Citizenship#												
U.S.	7430	259	92	412	663	267	642	336	300	1454	1499	1506
Foreign	1331	81	25	110	132	35	448	80	34	133	41	212
No Report	309	4	1	15	9	5	34	7	13	50	118	53

+Includes blacks, American Indians, Asians, and Hispanics.

#Excluded from this table are foreign citizens who received a Ph.D. from a U.S. institution but indicated at the time they received their doctorate that they planned to leave the United States.

Source: NRC, Commission on Human Resources, Doctorate Records File.

Table H.2 Demographic Characteristics by Field of Humanities Doctorate (July 1, 1978 to January 31, 1979)

	Field of Doctorate									
	All Fields	Hist	Art Hist	Music	Speech/ Theater	Phil- osophy	Other Human -ities	Eng/Amer Lang & Lit	Class Lang & Lit	Modern Lang & Lit
Total Population	1772	435	64	200	67	133	64	444	24	341
Sex										
Male	1101	322	24	143	39	103	31	250	19	170
Female	671	113	40	57	28	30	33	194	5	171
Race/Ethnic Group										
White/Caucasian	1455	350	61	165	58	108	50	391	23	249
Minority Group+	168	47	2	11	5	8	7	24	1	63
No Report	149	38	1	24	4	17	7	29		29
Citizenship#										
U.S.	1634	413	60	185	62	123	64	427	23	277
Foreign	79	11	2	3	3	6		6	1	47
No Report	59	11	2	12	2	4		11		17

+Includes blacks, American Indians, Asians, and Hispanics.
#Excluded from this table are foreign citizens who received a Ph.D. from a United States institution but indicated at the time they received their doctorate that they planned to leave the United States.

Souce: NRC, Commission on Human Resources, Doctorate Records File.